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Edited by

FRANCIS HEMMING, C.M.G., C.B.E.

Secretary to the International Commission on Zoological Nomenclature

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The problem of regulating the naming of Orders, Classes and other Taxonomic Categories above the Family level : a collection of papers submitted to the International Commission on Zoological Nomenclature

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BULLETIN OF ZOOLOGICAL NOMENCLATURE

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EDITORIAL NOTE

The present volume contains the second instalment of the documents which have been collected for discussion this summer at Copenhagen, first, at the Colloquium on Zoological Nomenclature, and, second, at the meetings of the International Commission on Zoological Nomenclature and the Fourteenth International Congress of Zoology.

The first instalment of these documents has been published in volume 8 and comprises the documents relating to : (1) the promotion of stability and uniformity in zoological nomenclature (D.1 Series) ; (2) the question of the recognition of neotypes as a category of type specimen (D.2 Series) ; (3) the question of the reform of the provisions in the *Règles* relating to the naming of Families and other suprageneric categories (D.3 Series).

FRANCIS HEMMING

Secretary to the International Commission on Zoological Nomenclature

28 Park Village East,
Regent's Park, London, N.W.1.
15th May, 1953.

CASE NO. 4

DOCUMENTS RELEVANT TO THE CONSIDERATION OF THE PROBLEM OF REGULATING THE NAMING OF ORDERS, CLASSES AND OTHER TAXONOMIC CATEGORIES ABOVE THE FAMILY LEVEL

DOCUMENT 4/1

Origin of the present investigation

The present investigation into the problem of regulating the naming of Orders, Classes and other Taxonomic Categories above the Family level was undertaken in response to a request addressed to the Secretary to the International Commission on Zoological Nomenclature at Paris in July, 1948, when, after giving preliminary consideration to applications submitted respectively by the late Mr. Edwin Ashby and the late Sir Sidney Harmer in regard to the names to be used for certain individual Classes (see Document 4/3), the International Commission agreed (1950, *Bull. zool. Nomencl.* **4**: 385–386) :—

> " (1) to recommend that Commissioner Francis Hemming (Secretary to the Commission) should be invited to make a thorough study, in conjunction with interested specialists, of the problems involved in securing uniformity in the nomenclature of categories down to, and including, the Categories Order (*Ordo*) and Sub-Order (*Sub-Ordo*), and to submit a comprehensive Report thereon, with recommendations, to the Commission at their meeting to be held during the next (XIVth) meeting of the Congress, with a view to the submission by the Commission of recommendations for the insertion in the *Règles* of comprehensive provisions dealing with this subject."

2. The foregoing recommendation, with other recommendations, was submitted to, and approved by, the Section on Nomenclature of the Thirteenth International Congress of Zoology at its Fifth Meeting held on 26th July, 1948 (1950, *Bull. zool. Nomencl.* **5**: 107).

DOCUMENT 4/2

General consultation with specialists and issue of an appeal for advice in 1952

Editorial Note : Attention is drawn to the review prepared by the Secretary to the International Commission on Zoological Nomenclature of the problems involved in the suggested regulation of the naming of Taxonomic Categories down to, and including, the Categories Order and Sub-Order which was published in March, 1952 (*Bull. zool. Nomencl.* **7** : 95–108). This review contained an appeal to specialists to assist in the present investigation by furnishing statements of their views on the action which it was desirable should be taken. It was in response to this appeal that the majority of the documents now submitted was furnished.

DOCUMENT 4/3

Examples of competing names for Classes submitted to the International Commission on Zoological Nomenclature

Note by the Secretary

Attention is drawn to two individual cases of competing names applied to the names of Classes which were brought to the attention of the International Commission on Zoological Nomenclature before the late World War and which, on being considered by the International Commission, jointly with the International Congress of Zoology in Paris in 1948, led to the decision that the present investigation of the question of regulating the naming of Orders and Higher Taxonomic Categories should be undertaken.

The applications relating to the foregoing cases were published in Volume 1 of the *Bulletin of Zoological Nomenclature* and it is only necessary here to give the references to the papers in question :

(*a*) Application, dated 13th June, 1933, submitted by the late Mr. Edwin Ashby (*Blackwood, South Australia*) on the relative merits of the names Polyplacophora and Loricara for the Class known as " Chitons " in the Phylum Mollusca (Ashby, 1946, *Bull. zool. Nomencl.* **1** : 176) ;

(*b*) Application, dated 1st February, 1938, by the late Sir Sidney Harmer (*British Museum (Natural History), London*), submitted through the late Mr. W. L. Sclater (then *Chairman of the "Zoological Record" Committee of the Zoological Society of London*) on the subject of the relative merits of the names Bryozoa and Polyzoa (Harmer, 1947, *Bull. zool. Nomencl.* **1** : 230–231).

DOCUMENT 4/4

Suggestions by Pe. **JESUS MOURE,** CMF, *do Museu Paranaense e Universidade do Parana,* and **L. TRAVASSOS FILHO,** *do Departmente de Zoologia de Sao Paulo*

NAMES FOR TRIBES AND SUB-TRIBES

In a paper entitled *Notas sobre a Nomenclatura dos Grupos superiores a Generos* published in November 1947 by the *Museu Paranaense* (*Publicoes Avulsas* No. 4), the above authors suggest that the basic principles for securing uniformity in the nomenclature of groups above the genus level should include the adoption of the termination "-ini" for the names of Tribes and of the termination "-ina" for the names of Sub-Tribes. See the Summary annexed to the above paper reproduced as Document No. 3/7 in the series of papers relating to the naming of Families.

DOCUMENT 4/5

Resolution adopted at the Final Plenary Session of the
CONGRESO CIENTIFICO MEXICANA, 1951
Letter, dated 29th October, 1951, from
LIC. JESUS SILVA HERZOG, Presidente, Comision Ejecutiva del Congreso

En le sesión de resoluciones y clausura del Congreso Científico Mexicana fue aprobada una proposi ción presentada por la Sección de Zoología del mencio nado Congreso, concebida en los siguientes términos :

" La Sección de Zoología del Congreso Cientí fico Mexicano propone : 1o.—Que todos los nombres zoológicos *ordinales* tengan una terminación uniforme que permits reconocer en cualquier nombre que la lleve su valor taxonómico, y 2o.—Que en caso de que el primer punto sea aceptado se estudie la posibilidad de emplear como destinencia característica la terminación— *informes*, ya adoptada en algunos groupos zoológicos."

En nombre de la Comisión Ejecutiva del Congreso Científico Mexicano, me permito comunicar a usted esta resolución, agradeciendo desde ahora la aten ción que se sirva darle.

DOCUMENT 4/6

By **LEONARD P. SCHULTZ**
(*Smithsonian Institution, United States National Museum, Washington, D.C., U.S.A.*)

Letter, dated 26th September, 1951, with enclosure

I received in this morning's mail from Mr. W. I. Follett, copies of correspondence concerning the subject of nomenclature of Suborders, Orders, and higher categories. As soon as I have time to work this over, I will send Mr. Follett my comments. In the meantime, I wish to call to your attention that I have assembled some data on this subject through a preliminary survey of some of the North American zoologists. These data were published in *Science*, **113** : 655–657, 1951. I have no reprints of the article but I am enclosing a single copy that was given to me.

I observed in assembling data on this subject that it is just as necessary (if not more so) to fix the endings of the categories below the Orders as it is to fix the endings of the Orders themselves. I urge you to consider the whole scheme of classification and not to confine your attention to Super-Orders, Orders, and Sub-Orders, etc. There is just as much need for fixing Tribe endings as there used to be for fixing Family endings. Perhaps you could give this some thought and write as soon as convenient to Mr. Follett.

Annexe

RESULTS OF A PRELIMINARY SURVEY OF GROUP ENDINGS IN ZOOLOGICAL CLASSIFICATIONS ABOVE THE CATEGORY OF GENUS

(Portion of a paper published in *Science*, **113** : 655–657, 1951)

Late in 1948 the author inquired of twenty-seven North American ichthyologists in regard to fixing specific endings for various categories of classification. Replies were favourable. In order to obtain information on a broader basis, during the early part of 1949 specialists in the fields of carcinology, entomology, herpetology, ichthyology, invertebrate zoology, malacology, ornithology, mammalogy, paleontology, and parasitology, were consulted. Entomologists and ornithologists have, to a certain extent, already adopted endings for various Groups of classification. After discussions with about twenty specialists in the various fields, and knowing that numerically entomologists nearly outnumber the specialists in all other fields together, it was decided to follow the endings as already used by entomologists from Superfamily down through Subtribe, but to follow ornithologists for the ending of an Order (-iformes) and for Sub-Order (-oidei) as used by certain vertebrate zoologists, both minorities, for the purpose of stirring up discussions and inviting comments. The results were interesting and valuable.

Somewhat as an afterthought the idea of a type genus was added to the circular letter sent out. This was an error, since it was misunderstood by a sizable percentage, who did not distinguish the type genus concept from the entirely separate concept of stabilisation of group endings.

The author sent out the circular letter to over 700 North American systematic zoologists on the mailing list of the Society of Systematic Zoology and received 445 ballots in return. This circular proposed to fix the endings of Groups above the level of the genus, and results were as follows :

Number of votes cast concerning proposed endings used in groups of classification

Field	Votes	Order -iformes	Sub-Order -oidei	Super-family -oidea	Super-Tribe -idi	Tribe -ini	Sub-Tribe -ina	Type genus	Unanimous ballots	Total ballots* returned
Carcinology	For	12	17	19	18	19	19	16	11	23
	Against	11	6	4	5	4	4	7	2	
Entomology	For	51	73	155	140	154	127	80	41	159
	Against	106	84	3	13	4	15	68	2	
Harpetology	For	24	24	29	26	27	26	19	17	30
	Against	5	6	—	2	1	2	8	—	
Ichthyology	For	37	39	39	38	39	38	38	32	41
	Against	3	2	1	1	1	1	1	—	
Invertebrate Zoology	For	30	31	36	38	38	37	30	25	50
	Against	12	17	12	9	9	10	12	7	
Malacology	For	10	11	16	13	13	13	10	7	17
	Against	7	6	1	3	3	3	7	—	
Ornithology	For	25	21	25	21	22	21	15	13	25
	Against	—	4	—	2	1	2	9	—	
Mammalogy	For	18	28	35	29	30	32	26	16	36
	Against	18	6	—	5	4	2	9	—	
Paleontology	For	10	10	20	19	17	14	12	7	29
	Against	17	17	7	8	10	13	15	5	
Parasitology	For	29	33	34	31	33	31	29	24	35
	Against	6	2	1	3	2	3	5	—	
Totals	For	246	287	408	373	392	358	275	193	445
	Against	185	150	29	51	39	55	141	16	
GRAND TOTAL		431	437	437	424	431	413	416	209	
Per cent.	For	57.1	65.7	93.3	88.0	91.0	86.7	66.1		
	Against	42.9	34.3	6.7	12.0	9.0	13.3	33.9		

* Some ballots did not have votes on every item.

The following information is summarised from comments received on about half of the ballots returned : "A wonderful idea and attempt to advance stability of zoological nomenclature" ; " Leave nomenclature alone and get back to the study of specimens."

Order -iformes : Too long ; not widely used, preferable not to disturb ordinal and subordinal endings in such groups as entomology, mammalogy and herpetology since these are so well known they are already fixed by usage ; ordinal names should not be changed except for reasons of concept ; let each group of specialists for each class of animals decide for themselves what ending should be used.

Suborder : Little or no comment.

Superfamily : Little or no comment.

Supertribe, tribe, subtribe : These categories are used in the most complicated groups of species, mostly in insects, fishes and crustacea. Some individuals voted against these categories because they did not use or need them in their own specialty. A sizable majority want the endings for these categories fixed for all time. Mary Rathbun in crustaceans was the only one mentioned using these groups above the family level.

The following is a summary of nomenclatorial comments on group endings :

(1) Against retroactive action, basic idea stability, not uniformity ; (2) *-idi* and *-ini* too much like *-idae* and *-inae* in sound when pronounced ; (3) *-ina* and *-ini* conflict when same ending occurs for a genus ; (4) endings of higher categories should be selected grammatically ; (5) *unanimous against* in the table, 16 ballots, indicates disapproval of any change and a misunderstanding of the type genus concept. It was observed that several of the *unanimous against* ballots came from individuals who had worked in a narrow specialty for a long time ; (6) *unanimous for* in the table, 193 ballots, indicates a willingness to go along with any change that will stabilise nomenclature, and they think that the type genus concept including super-family can be worked out with a great contribution toward stability, including superfamily, but not above that category ; (7) Advantageous to have characteristic fixed endings for each category of classification of animals, and stabilize names all the way down from Kingdom ; (8) Let law of priority fix all cases, discard all official lists ; (9) Premature action and lack of polling zoologists, lack of effective conservanda system has invalidated whole present code of zoological nomenclature, new rules are a bar to progress.

The following is a summary of comments in regard to the type genus concept. The author feels his presentation was too short, not clearly stated, therefore it was misunderstood by a sizable number of systematists. Ending and the type genus were intended to be two separate concepts. In spite of the obvious confusion 66.1 per cent. would fix a type genus through the Superfamily. (1) Type genus of any Family must be type genus of all lower categories to which it belongs zoologically ; (2) establishment of type genus for any category below Family, constitutes establishment of type genus for all categories below to which it belongs zoologically. (3) Each type genus serving as the stem for group names should be selected on basis of : (*a*) family of world-wide distribution ; (*b*) known in all lands, common, important, famous ; (*c*) typical of the Order or Group ; (*d*) recent, if possible, then fossil ; (*e*) priority alone not to be considered except in case of controversy ; (*f*) committee of eleven specialists should represent each class and be international in scope, not more than two members from each country, and sub-committees set up for Orders or Families if desirable ; (*g*) type genus must not be based on a homonym. (4) Should follow law of priority. (5) Group names should be based on older names instead of selecting new ones. (6) For each class print a tentative list and distribute same to all working systematists in each class and five years later reprint with all corrections after which date this becomes the *official list* and fixes all Group names. (7) Use synonyms of a valid genus for Family names if already in wide use. (8) Fixing of the genotype has cleared up most genera, and it would do so for Families and Tribes. (9) Genotype for type genus should be (*a*) illustrated, based on oldest included genus, following concept of first revision ; (*b*) all decisions to be based on already established nomenclatorial rules.

The results of this survey were presented at the June 1950 scientific meeting in Salt Lake City and several zoologists urged that an extensive

international survey should be undertaken on a basis of revised endings which are herein outlined. The author, on 21st February, 1950, presented the results of the survey to the Nomenclatorial Discussion Group in Washington, D.C., and a committee was appointed with the author as chairman for the purpose of investigating the matter further. Representatives of the major fields listed above acted on the committee. They are : F. A. Chace, B. G. Chitwood, G. A. Cooper, H. M. Friedman, E. R. Hall, D. H. Johnson, E. A. Lachner, R. C. Moore, H. A. Redher, E. G. Reinhard, C. W. Sabrosky, H. B. Stenzel, and W. Stickle.

Various endings for categories above the genus have been proposed and considered by the above listed committee and again by about forty systematic zoologists at Salt Lake City in June 1950. They are as follows :

		AAAS Pearse Committee	B. G. Chitwood	J. W. Durham and R. C. Moore	L. P. Schultz	H. B. Stenzel	
Order	super	-ida		-ida		-ica	Neuter
	main	-ida	-ida	-ida	-iformes	-ida	
	sub	-ina	-ina	-ina	-oidei	-ina	
Family	super		-oidea	-oidae	-oidea	-icae	feminine
	main		-idae	-inae	-idae	-idae	
	sub		-inae	-inae	-inae	-inae	
Tribe	super				-idi	-ici	masculine
	main		-idi		-ini	-idi	
	sub		-ini		-ina	-ini	

The most logical system of endings was proposed by H. B. Stenzel and published in *Science*, **112**, no. 2899, p. 94, 21st July, 1950. Stenzel's plan of endings is logical and aids memory by having two letters of each ending repeated in each comparable group : super-, main-, and sub-. A further memory aid is the suggested use of the neuter, *-a*, for endings of Superorder, Order and Sub-Order ; feminine, -ae, for Superfamily, Family, and Sub-Family, and masculine, *-i*, for endings of Supertribe, Tribe, and Sub-Tribe. These endings are short and conform closely to the endings for Family and Sub-Family already adopted in zoological nomenclature. Ichthyologists at the meeting of the American Society of Ichthyologists and Herpetologists on 22nd June, 1950, at Salt Lake City, voted unanimously to follow the Stenzel system of endings as proposed. Since there was a very definite opinion not to alter endings for Orders and Sub-Orders in certain fields, but the opinion was very strong for fixing uniform endings for Superfamily on down through the Sub-Tribe, it was recommended that a new ballot be sent out.

DOCUMENT 4/7

By **G. H. E. HOPKINS, O.B.E., M.A.** (*British Museum* (*Natural History*), *Zoological Museum, Tring, Herts.*)

Enclosure to letter dated 13th March, 1952

THE POSSIBLE ADDITION TO THE "RÈGLES" OF PROVISIONS GOVERNING THE NAMING OF ORDERS AND HIGHER TAXONOMIC CATEGORIES

If any addition to the *Règles* of provisions governing the naming of taxonomic categories higher than the family is to be made (as seems to be desirable), it is extremely important that the problem should be approached with great caution or we are liable to find large numbers of familiar names disappearing as junior synonyms or as junior homonyms.

Because two rival names are in common use for the Order comprising the fleas, and because the principle of priority had been invoked in favour of one of them, I undertook an investigation into the question what would be the correct name of the Order if the principle of priority were to be applied to the names of Orders and higher taxonomic categories. The results were complicated by several undecided nomenclatorial questions, but as my findings have been published in full (Hopkins, 1951, *Entomologist* 84 : 208-214) and as the case is only being mentioned here as an example, it seems justifiable to simplify it by assuming that the Commission would decide doubtful points in the way that seems to me to be probable. Making this assumption, and remembering that I was concerned only with the name of the fleas and therefore made no attempt to follow up any side-lines, the following facts emerged from my enquiry :—

(i). Neither of the rival Ordinal names (Siphonaptera and Aphaniptera) which, between them, are applied to the fleas by more than 90% of present-day zoologists is the senior name for the Order, nor is Suctoria, which has been revived (after long disuse) by one eminent entomologist in the vain hope of thus settling the controversy but which has not been taken up by any other author. The oldest name for the fleas is Aptera Linnè 1758, originally composite but restricted to this Order by Leach in 1815, this restriction being far earlier than that of Shipley (1904) to another Order of insects. The name does not appear to have been used for the fleas by any author since Leach, but is sometimes used for the Order to which Shipley restricted it, also known as the Thysanura.

(ii). The next two most senior names for the fleas are Saltatoria and Suctoria, both dating from Retzius (1783) and published on the same page

but the former with " page precedence " and possibly not to be regarded as an Ordinal name. Both these names are in current general use for taxonomic categories other than the fleas, the former for one of the main divisions of the Orthoptera and the latter for a group of the Protozoa, but in both cases their application to the fleas is much earlier.

(iii). There are two more names senior to Siphonaptera and Aphaniptera (both of which are relatively late), but as these are neither senior synonyms for the Order comprising the fleas, nor senior homonyms of names in current use for other taxonomic categories, they need not be mentioned. The only two names that have been in anything approaching general use for the fleas during the last hundred years are Siphonaptera and Aphaniptera. Most of the other names have either only been used once or twice for this Order, or almost exclusively by a single author.

Summarising my findings, the enquiry into this one small problem has shown that, assuming the application of the principle of priority to names of Orders and higher taxonomic categories to be adopted, not only both the rival names in common use for the fleas, but also two other names in general use (and a third that is sometimes used) for other large taxonomic units in zoology would be invalid, the two names for the fleas as junior synonyms and the other names as junior homonyms of names previously applied to the fleas. It seems possible that this state of affairs may be frequent in connection with the names of taxonomic units higher than the family.

In my opinion, the only way to avoid chaos is to ensure that any provisions governing the naming of Orders and higher taxonomic categories should not be retrospective but apply only to names given after the new provisions come into force. With regard to names already given, specialists on each Class should be requested to draw up a list of names in general use, and these (together with their type families) should be published in the *Bull. zool. Nomencl.* for criticism. I have little doubt that there would be general agreement on the vast majority of the names, particularly if it is carefully explained in the request that in drawing up the lists only the question of what names are in general use (not whether these names are technically valid or not) should be considered. The International Commission on Zoological Nomenclature should be empowered to place undisputed names on an Official List and to adjudicate with regard to the remainder.

DOCUMENT 4/8

By **L. B. HOLTHUIS**
(*Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands*)

Letter dated 15th April, 1952

As far as I can see the nomenclature of Orders and higher taxonomic categories is in such a disorder, that it will be hardly possible to fix rules as to the nomenclature of these categories without upsetting a lot of well-known names or without having to make a very large number of exceptions to these rules. Since the number of scientific names of Orders and higher taxonomic units is rather restricted, I am wondering whether it would be possible to set up a Commission of zoologists, who have an interest in the taxonomy of higher groups in the Animal Kingdom, to make, in consultation with specialists of the various groups, an " Official List of Names of Orders and Higher Taxonomic Categories in Zoology ", which should contain the scientific names of all categories which at present are currently accepted. This commission has to make out : (1) which names should be used for the various categories and in what spelling, (2) who is the author of each name, (3) what should be considered the date of publication of the name, (4) what is the type unit of each category. It is advisable that this commission in making this list should be guided by the principles laid down in your paper (1952, *Bull. zool. Nomencl.* **7** (4) : 95–108), but that they have the right to deviate from these principles.

After the publication of this List, the scientific names, the author's names, the dates of publication and the type indications given in it should have to be accepted as correct. All the names of Orders and higher taxonomic categories not included in this list and published before the date of publication of this list should be regarded as not having been published at all. To the names of Orders and higher categories inserted in the list and those published after the date of publication of the list, the law of priority should be applied.

What is not possible with trivial, generic, and even family names, namely, to make a complete official list, seems to me to be very well realisable here, since the number of Orders and higher taxonomic categories is not too large. Most textbooks go down to the level of the Order. Pearse's " Zoological Names. A List of Phyla, Classes and Orders " (Durham, 1949) even lists all names down to Sub-Orders. A complete Official List of Orders and higher Categories in Zoology will enable us to make a fresh start without upsetting a lot of well-known names.

DOCUMENT 4/9

Suggestions furnished by **FRANZ DANIEL**

(*Zoologische Sammlung des Bayerischen Staates, München, Germany*)

Editorial Note : Attention is drawn to the comprehensive scheme for promoting stability in zoological nomenclature set out by Dr. Franz Daniel (*Zoologische Sammlung des Bayerischen Staates, München*) in a letter dated 30th April, 1952, which has been reproduced as Document 1/25 in the series of documents relating to the stability problem, since that scheme contemplated, *inter alia*, that the names of Orders and higher taxonomic categories should be stabilised through the designation of types by agreement among specialists in the groups concerned.

DOCUMENT 4/10

By **Th. HALTENORTH** (*Museum, München, Germany*)

Statement, dated 14th May, 1952, communicated by
Professor E. M. HERING

III. Einverstanden. Bei B.1 und B.14 is Fassung (a) zu bevorzugen.

EXPLANATORY NOTE

The foregoing comment was prepared by Dr. Haltenorth in response to an invitation by Professor E. M. Hering who had prepared the following synopsis of the problems at issue for consideration by German zoologists. It is to this document that the numbers cited by Dr. Haltenorth refer.

III. Vorschläge für Einordnung der Ordnungen and höherer Kategorien in die " Regeln "

A. Problem : Die " Regeln " geben keine Vorschläge und Vorschriften für die Behandlung dieser Kategorien. Aufzunehmende Vorschriften müssen *mehr Rücksicht auf Stabilität als auf Uniformität* nehmen.

B. Verschläge für die neuen Vorschriften.

1. Kennzeichnung der Ordnung durch *typische Familie* oder bei Fehlen einer selchen durch typische Gattung. Wird die Ordnung später in Familien auf geteilt, muss das typische Genus in die typische Familie gestellt werden.

   Oder: es ist *vorzuschreiben ein typisches Genus*, das auch später typisches Genus jeder untergeordneten Kategorie werden muss.

2. Die *Endung* kann aus Gründen der Stabilität *nicht uniform* sein. Man könnte vorschreiben, dass die Engung der in der zugehörigen Klasse üblichen ontspricht, dann ergeben sich Schwierigkeiten, wenn die Ordnung in andere Klasse versetzt wird.

3. *Koordinierung* von Ordnungs-Namen mit denen *untergeordneter Kategorien* oberhalb der Familie. Ob auch wohl mit denen der Klassen ?

4. *Anerkennung einer Ordnungsbezeichnung* soll analog den in II für die Familien festgelegten Prinzipien erfolgen. Mit Inkraftsetzung der neuen Regeln nur noch mit Familien-Typus ; wenn vorher, schon als Ordnung bezeichnet und etwa vor 1950 geformt, dann Sonderbehandlung durch INK.

5. *Prioritätsgesetz* wird nicht gefordert für das 1 Jahrhundert nach 1758, soll aber für alle nach der Neufassung der " Regeln " aufgestellten massgeblich sein.

6. *Emendierungs*-Vorschriften die gleichen wie für die Familien.

7. *Nominotypische Bezeichnungen* für Unterordnungen, Unterklassen und Subphyl vom Stamm der Ordnungsbezeichnung sind unerwünscht, da Stabilität der Namen dadurch stark gefährdet würde.

8. *Citation:* Autor und Datum sellen den Ordnungs-pp. Bezeichnungen hinzugefügt werden, wenn Aufnahme der Vorschriften in die " Regeln " erfolgen sollte.

9. *Homonymie* bei Ordnungsnamen (z.B. Decapoda bei Crustaceen und Cephalopoden Vorschlag :

   (*a*) Wenn die Homonymie bereits vor Neufassung der Regeln besteht, soll INK. entscheiden.

   (*b*) Wenn die ältere Bezeichnung vor, die jüngere nach Inkraftsetzung der neuen Regeln gebildet, und wenn

   (*c*) beide nach der Neufassung gebildet wurden, ist der jüngere Name zu verwerfen.

10. *Nomonymie* zwischen *Genus-und Ordnungsnamen.* Opinion 102 hatte bestimmt, dass Homonymie zwischen beiden nie bestehen kann. Es sollen aber künftig keine Gattungsnamen gebildet werden, die schon als Ordnungsnamen Verwendung fanden, wenigstens nicht für Gattungen in der betreffenden Ordnung. (Xyphosura in Ordn. Zypnosura !) Neubildungen in Gattungen and Ordnungen können bereits bestehende Namen nicht ungültig machen.

11. *Koordinierung* und gleiche Behandlung von Ordnungen, Klassen und Phylen.

12. Wenn Ordnungen und *höhere Kategorien vom gleichen Stamm* gebildet sind und sich nur in der Endung unterscheiden, soll keine Namenänderung erfolgen.

13. Schaffung einer "*Offiziellen Liste*" und eines "*Offiziellen Index*" für Ordnungen und höhere Kategorien analog den schon bestehenden Listen für Gattungs-und Artnamen (Nomina conservanda und verworfene Namen).

14. Allgemeiner Vorschlag :

    (*a*) In die Regeln werden Vorschrift über Anwendung des Prioritätsgesetze vorgeschrieben, wo Namensänderung oder -Beibehaltung ihnen entgegen gefordert wird, kann beides auf Spezialisten durch INK. erfolgen, oder

    (*b*) Es werden ähnliche Regeln geschaffen, aber ohne Gesetz der Priorität und Zwang zur nominotypischen Familienbezeichnung, und auf Antrag des Spezeialisten bestimmt in umstrittenen Fällen INK. Namen und Typenbezeichnung.

DOCUMENT 4/11

By **W. J. ARKELL**, M.A., D.Sc., F.R.S.

(*Sedgwick Museum, Cambridge University, Cambridge*)

Extract from a letter dated 23rd May, 1952

I have read with admiration your most thorough and clear papers in the *Bull. zool. Nomencl.* **7**: Parts 1–6.

. . . . On Z.N.(S.)360 (Ordinal Names), I have no comments, and I should be content to see these matters go through as expounded in your paper.

DOCUMENT 4/12

By **J. R. DYMOND**

(*University of Toronto, Department of Zoology, Toronto, Canada*)

Statement received on 27th May, 1952

I approve the suggestion in Vol. 7 of the *Bulletin of Zoological Nomenclature* that provisions relating to the name of Orders and Higher Taxonomic Categories be inserted in the *Règles*.

I consider it necessary that each nominal Order be provided with a " type " which shall be irremovable from that Order and constitute the sole means by which the Order shall be identified.

I consider that either of the suggestions for the designation of a "type" would be satisfactory but prefer the second, namely (i) that every nominal Order must have a "type genus" and (ii) that the "type genus" of an Order shall also be the "type genus" of each successive nominotypical sub-unit (e.g., infra-Order, sub-Order, etc.) into which the Order concerned may be divided.

I believe it desirable to provide for uniformity of termination of Ordinal names within particular groups where this is in accordance with the wishes of specialists in the group concerned.

I believe it to be impracticable to apply the principles of priority for the purpose of determining the relative status of all Ordinal names.

I recommend that the scheme relating to Ordinal and co-ordinate names should provide that the emendation of such names shall be subject to the same conditions and procedure as that prescribed for family names.

It is unwise in the interest of stability to introduce a rule that the name of the nominotypical sub-Order of an Order should be tautonymous with or even necessarily based upon the same word as the name of the Order concerned.

The practice of citing the name of the author and the date of publication of Ordinal names should be formally recognised by the *Règles* as correct.

A stop should be put to homonymy as between Ordinal names. It is suggested that where a situation of homonymy is found to exist as between two Ordinal or other nomenclatorially co-ordinate names, each published prior to the introduction of the revised scheme, the question which of the names in question is to be rejected in favour of the other is to be referred to the International Commission on Zoological Nomenclature for decision.

It is suggested that, for the purpose of determining whether any two Ordinal or other co-ordinate names consisting of very similar but not identical words are to be treated as homonyms of one another, the provision recommended for family names should be applied.

Classes and Phyla should be provided with types.

I can see no valid reason for prohibiting the use of the same word as the base of names belonging to successive taxonomic categories.

Provision should be made for establishing an Official List of the names of Orders and Higher Taxonomic Categories in Zoology.

To avoid extensive changing of names on the inclusion in the *Règles* of regulations for the naming of Orders, Classes and Phyla, I suggest that the Commission be authorised on the application of specialists to determine the names to be accepted as valid and to prescribe the type to be accepted for the purpose of providing the unit so named with an objective concept.

DOCUMENT 4/13

By **S. G. KIRIAKOFF,** L.SC.
(*Zoological Museum, Ghent University, Belgium*)

Enclosure to a letter dated 5th June, 1952

COMMISSION'S REF. Z.N.(S.)360. NAMING OF ORDERS AND HIGHER TAXONOMIC CATEGORIES (*Bull. zool. Nomencl.* **7** : pt. 4, pp. 95–130)

I agree with the contents of the above paper.

Regarding paragraph **19**, I would prefer alternative No. 2.

I suggest that there be uniformity in termination of Ordinal names within each class.

I suggest that in the class Insects the terminations of Ordinal names be : "-ptera ".

Regarding paragraph **7**, I think that a co-ordination of Ordinal names with sub-Ordinal ones would necessitate too many changes (at least as far as Insects are concerned).

Annexe

APPENDIX TO ANSWERS TO INQUIRY

Comm. ref. Z.N.(S.)357 and 360

Great as would be the improvement if and when the provisions proposed in your inquiries labelled Commission's ref. Z.N.(S.)357 (Family names) and 360 (Ordinal names) were to be accepted by the forthcoming Zoological Congress, these provisions still remain incomplete. There is, indeed, a gap left between the Sub-Order and the Superfamily. In many cases, the need for a taxonomic category which is intermediate between the two latter is not felt ; but there are cases where it is. So, for instance, in my Classification of the Lepidoptera and Related Groups, I have been led to use the cohortal group of taxonomic categories, including the supercohors, the cohors and the subcohors, because the use of Superfamilies alone would have been quite inadequate to express the nearer relations between the various phyletic stems and branches, each consisting of one or more Superfamilies.

I believe the *Règles* should provide for such cases, because, as I know, there are specialists who hesitate to use those taxonomic categories which they believe to be " illegal ". If there is any necessity to provide for the legalisation of the superfamilial, tribal, and other higher categories, the same necessity exists, I think, where the cohortal group is concerned.

I therefore ask you whether it would be possible to extend the purport of the proposed improvements to the cohorts, including the categories just above and below the latter, i.e. the supercohorts and the subcohorts. As you will see from my paper referred to above, I have used for supercohorts and cohorts descriptive Greek names terminating with the indication of a part of the body ("-ptera ", "-poda " ; other terminations could be "-stomata ", "-cephala ", "-ura " and so on), and for subcohorts the stem of the typical Superfamily name terminating with "-iformes ".

DOCUMENT 4/14

By **ERICH M. HERING**

(*Abteilungsleiter am Zoologischen Museum der Humboldt-Universität zu Berlin*)

Statement received on 7th June, 1952

STELLUNGNAHME ZU DEN VORSCHLÄGEN ZUR EINFÜHRUNG VON VORSCHRIFTEN ÜBER DIE BENENNUNG DER ORDNUNGEN UND HÖHEREN KATEGORIEN IN DIE " RÈGLES "

Der Zoologen-Stab des Zoologischen Museums der Humboldt-Universität zu Berlin unterstützt die in *Bull. zool. Nomencl.* vol. **7**, pt. 4, pp. 95–108 ausgeführten Vorschläge mit 14 von 14 Stimmen.

Es soll in die *Règles* eine Vorschrift über die Anwendung des Prioritätsgesetzes aufgenommen werden, aber die International Commission on Zoological Nomenclature soll die Vollmacht erhalten, zum Zwecke der Erhaltung der Stabilität auf Antrag der Spezialisten in gewissen Fällen auch gegen das Prioritätsgesetz Entscheidungen zu treffen.

Annexe to statement furnished by Professor E. M. Hering

Views of Dr. **WALTER FORSTER**

(*Zoologische Sammlung des Bayerischen Staates, München, Germany*)

Dr. Walter Forster von der Zoologischen Sammlung des Bayerischen Staates in München teilt mit, dass der Stab der befragten Zoologen am Museum München sich in gleichem Sinne mit 11 von 12 Stimmen für die Unterstützung entschieden hat.

DOCUMENT 4/15

By **JOSHUA L. BAILY, Jr.** (*San Diego, California, U.S.A.*)

Statement received on 24th June, 1952

A species is an entity which exists in nature. When two people speak of the same species they speak of the same thing, and in order that they may use the same name for the same thing rules and regulations are indispensible.

Genera do not exist in nature, but in the mind. They are conceptions, not objects. But since the generic name is part of the specific name and therefore always included in it, the rules governing specific names must also govern generic names.

Since family names are derived from generic names, a case could be made out for extending the rules to govern family names as well ; these is no particular objection to this, provided that the rules are so formulated that they do not cause confusion by being applied.

But there is no reason for the application of rules to categories of higher rank than that of superfamily. The significance of such names is subjective and not objective, and it is clear that the author of such a name will have a clearer idea of what it denotes than a commission whose interpretation of it is not direct, but derived indirectly through the application of rules. If an author sets up a group which subsequent study shows to be an unnatural one, it would be better to abandon its name altogether, rather than to attempt to preserve it as the name of a new group with different limits which may or may not contain some of the same genera in the group originally defined.

The names *Cryptobranchia* and *Asthenodonta* have each been applied to a suborder and a genus ; it would seem to me wiser not to formulate a rule that would automatically decide in favour of either use, but to rule that anyone encountering a similar instance should report the same to the Commission and request a decision by suspension of the rules under the plenary power now held by the Commission.

DOCUMENT 4/16

Statement of the views of the

SCIENTIFIC STAFF OF THE ROYAL ONTARIO MUSEUM OF NATURAL HISTORY, TORONTO, CANADA

Enclosure to a letter, dated 26th June, 1952, from
Dr. F. A. URQUHART, *Director*

(For the text of the above letter, see Document 1/39)

COMMISSION'S REFERENCE Z.N.(S.) 360

We unanimously agreed that every nominal Order must have a type genus and that the type genus of an Order shall also be the type genus of each successive nominotypical sub-unit into which the Order concerned may be divided.

We unanimously agreed with your suggestion as put forward in paragraph 13, page 103, of volume 7, part 4.

We unanimously agreed that, like Orders, higher categories should be provided with types, which presumably would normally be, in the first case, type Orders and, in the second case, type Classes, for, like a nominal Order, a nominal Class or a nominal Phylum remains indeterminate until it has been provided with a type, by means of which its content for nomenclatorial purposes alone be defined.

We unanimously agreed to the suggestion set forth in alternative No. 2 as described by you in paragraph 19, page 107, of volume 7, part 4 of the *Bulletin of Zoological Nomenclature*.

Suggestion.

After considerable discussion we felt that it was most unfortunate that many names of Orders bear little significance to the objects contained within that Order. For instance, in the field of entomology there are such names as " Lepidoptera " which means scaly-winged. Entomologists are well aware of the fact that there are many kinds of insects not belonging to this Order that possess scaly wings. Another good example is the Order name " Hymenoptera ". There are many kinds of insects belonging to many Orders which would fit into the description as given by this name. We find similar erroneous suggestions in the Order names in Ichthyology, Ornithology,

Mammalogy and Herpetology. We therefore would like to offer the following suggestion, realising as we do the difficulties that would arise if such a suggestion were put forward :

In view of the fact that we select a definite species to act as the type for a genus, that we take the type genus as a type of the Family name, why should we not go a step further and take the type Family name as the name for the Order ?

In presenting courses on systematic zoology to the students a given Order is described in reference to certain well-defined representatives. Hence those so engaged in teaching are actually using " Typical genera " or a typical Family to define an Order. It would be indeed much simpler for the student to understand a definite scheme in which the basis of the naming system hinges upon a well-defined group of animals. To take but one example : if, for instance, it was agreed that in the Order Orthoptera the type Family would be the Family Acrididae, then the name of the Order might be Acridia. At the present time the Order name " Orthoptera " has little bearing on the names applied to all categories beneath the Order, or to a family which would be descriptive of the group as a whole.

F. A. URQUHART,

Director, Royal Ontario Museum of Zoology and Palaeontology, University of Toronto.

DOCUMENT 4/17

By **A. MYRA KEEN** and **SIEMOM W. MULLER**

(*Stanford University, Stanford, California, U.S.A.*)

Enclosure to a letter dated 1st July, 1951

COMMENT ON THE PROPOSAL TO INCLUDE ORDERS AND HIGHER TAXONOMIC CATEGORIES IN THE " RÈGLES "

As with Family names, the amount of historical research necessary to establish priority for the various Ordinal and other names of higher categories seems to us to militate against bringing such names within the coverage of the *Règles*. A series of recommendations for future guidance might be useful, but the codification of the names now in use seems to us unnecessary and even undesirable.

DOCUMENT 4/18

Statement of the views of the

COMMITTEE ON NOMENCLATURE OF THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK

Enclosure to a letter, dated 10th July 1952, from
Dr. JOHN T. ZIMMER, Chairman

(For an extract from the above letter, see Document 1/41)

Z.N.(S.) 360. Nomenclature of orders and higher groups. Rather than elaborate rules for such groups, the alternative proposal of an Official List would be much more satisfactory. Uniform terminations need not be used for any of these grades. There is little uniformity throughout zoology at present and changes would be far-reaching and confusing to non-zoologists.

A.M.N.H. Committee on Nomenclature.

(Signed) EDWIN H. COLBERT.

JOHN T. NICHOLS.

ERNST MAYR.

GEORGE H. H. TATE.

JOHN T. ZIMMER (*Chairman*).

DOCUMENT 4/19

By **HENNING LEMCHE**
(*Universitetets Zoologiska Museum, Copenhagen, Denmark*)

(1) Letter dated 17th July, 1952

In an earlier letter* I have tried to show that the ruling on family names are better limited to the questions of how to construct them and the way of deciding their type genera.

When we come to the case of the higher categories, the question is more complex, and at least four different ways of treating the current chaos can be imagined.

(1) To make no rulings at all and let the chaos continue. I would not vote for this way except in the domain of Classes and still higher categories, where, in the interest of the non-zoological public, we cannot alter too much, and where the names in general have been stabilised through many years. In the domain of Orders I prefer other solutions.

(2) To make some strict and definite ruling at once, stating that every name of any Order, Class, etc. is invalid if not formed in a definitely specified way, or deciding that all endings have to be changed at once in a certain way. Such a procedure would be rational, but we have no power to carry it through, and it would certainly fail against the resistance of zoologists.

(3) To rule at once in a way fixing more or less the present chaos. (Your proposal.) This is a possible way, because specialists in every single group would not feel their special interest threatened. However, this solution means that we give up at once and for ever any attempt to bring some conformity into the domain of the names of Orders. If once established, this rule would be extremely difficult to alter in favour of a new attempt to reach conformity. So, I regard your proposal as the last resort if every better proposal fails, but I do not feel that it is a good solution. It will need quite a number of intricate Rules to be arranged for, and there will come out large numbers of controversies to be settled by the Commission.

(4) I think, however, that a better way will be to make *no Rules now*, but to give a few clear *Recommendations*, urging authors to follow some definite

* The letter here referred to is reproduced as Document 3/28 in Volume 8.

proposals, but without imposing any force at present. People do not like to be forced, but they often ask for advice. Why not, then, give them the advice that the Commission (Congress) is of the opinion that the best way would be to follow (say) the following Recommendations :

ARTICLE 4.

Recommendation II.—Authors are earnestly asked to construct the names of super-Orders, Orders and sub-Orders in a way exactly parallel to those of families, etc., by adding the ending " **-INEA** " for sub-Orders, "**-IDEA** " for Orders, and ides for super-Orders, to the stem of the name of the type genus in question.

ARTICLE 5.

Recommendation II.—Authors are invited to treat the names on the Ordinal level (if derived in the way prescribed in Recommendation II of Article 4) in a way similar to that prescribed in Article 5 for names on the family level.

N.B.—As explained in a special letter,* I have changed my opinion concerning the use of the ending " **-IDEA** " (" **-OIDEA** "). In my previous letter of 30th June, 1952†, I proposed the ending idea for superfamilies. Now, having returned to Denmark, I have studied the factual names of Orders, etc., in different animal groups and find that the ending " **-IDEA** " is so often used for Orders as to cause confusion if used now for superfamilies. As, moreover, the ruling would gain if some simple system could be applied, I propose now to use the ending " **-IDA** " for superfamilies. This would give the simple row of endings: **"-INI", "-INAE", "-IDAE", "-IDA", "-INEA,"** " **-IDEA** ", " **-IDES** ".

Remarks. As will appear from the above, I have studied the question of whether it is advisable to combine the effort to stabilise nomenclature both in the domain of Orders and in the domain of Classes. It seems that most names of Classes have reached such a stability that very few alterations are likely to occur if the whole problem is left without treatment. Thus, we may expect to meet a very strong resistance against any attempt to attain some conformity. As shown below, this stability has not been reached within the domain of Orders, and we may run the risk that an attempt to rule in this last domain will be greatly hampered if combined with an effort to introduce conformity into the domain of Classes. Therefore, I regard the said danger as so real that I would prefer not to make definite proposals at present concerning the names in the domain of Classes, and to concentrate around the problem of the names of Orders.

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* See letter of 17th July, 1952, below.

† See Document 3/28.

In my own field, the opisthobranch gastropods, a well defined Sub-Class with new and much better founded subdivisions have been proposed for one half (the nudibranchs) or are being proposed in the near future. In the other half, my own studies show that the divisions now in current use cannot stand at all, so that new Sub-Ordinal names will have to be proposed at the first future revision. Similar situations are certainly found in many other groups of invertebrates. So far as I can see, stabilisation through long use of certain names in the Ordinal level have not occurred except in some few groups: mammals, birds and many insects (and perhaps some echinoderms where my new proposal would conform with general practice or be very close to it). Even so, in quite a number of insect groups the divisions are not too stable (compare the names of Handlirsch and of Weber). In fishes, the ordinal names are rather new and are not too generally known by non-specialists. I cannot see why it should be impossible to ask authors to change the endings in such groups. The stability concept would not even be hampered thereby, as it is the stem of the name that gives the real indication of what is the meaning of the term, and the new ending would just indicate the rank of the group better than if the old ending is retained.

In my view, the gain for zoological science would be enormous if we could lead the development in nomenclature towards the proposed end. It would mean that any ruling concerning Ordinal names would be unnecessary except the adding of some very few words to the Articles 4 and 5. It would mean that no *List of Ordinal Names* would be necessary. It would mean that a lot of controversies to be decided upon by the Commission would simply never come up. No author names and dates behind the names of Orders would be necessary just as in the Family name level—and the very bad question of priority could be totally avoided. Similarly, the wish for making new categories after which to add your own name would be prevented in coming up in the mind of any author interested therein. Last, but not least, it would be an enormous advantage for the zoological science as such if the system was made as easy and clear as it would be under the proposal here submitted.

Therefore, we have everything to gain and nothing to lose if we adopt the procedure to *recommend*, but not to rule definitely, as the first step towards conformity in names on the Ordinal level. In the few groups where the concepts of Orders have been stabilised for such a long time that confusion would arise if the names were to be altered to conform with the general principles now proposed, we could save the names through the procedure prescribed for " Nomina conservanda ".

(2) Letter dated 17th July, 1952

In preparing a responsum on the question of the names of Orders and Classes I found that it would be convenient to use the ending " -IDEA " not for superfamilies, but for Orders. In a survey that I had no opportunity to make on board the *Galathea*, but which I have made now, on the actual names of higher categories in the animal kingdom, I found that the ending " -IDEA "

has been used so often, and is nearly always centering round the concept of Orders, that it would mean unnecessary confusion to transfer it to superfamilies. As the ending " -OIDEA " might in several cases be too close to " -IDEA ", I should not like to go in for this ending either. In another letter to you sent together with this one, I propose to use the ending " -IDEA " for Orders, and hence I wish to alter my proposal concerning superfamily-names, and to make an amendment to your proposal. It is quite clear that the concept of superfamilies is a less important one, the ending of which could be made quite arbitrarily without serious damage and I would like now to propose the ending " -IDA ".

DOCUMENT 4/20

By **E. RAYMOND HALL**

(*University of Kansas, Department of Zoology, Lawrence, Kansas, U.S.A*)

Enclosure to a letter dated 22nd July, 1952

Probably no rules should be adopted in 1953.

DOCUMENT 4/21

Statement setting out the views of members of the

NOMENCLATURE COMMITTEE OF THE SOCIETY OF SYSTEMATIC ZOOLOGY

(Letter, dated 22nd July, 1952, with enclosures, from Dr. W. I. FOLLETT, Chairman)

ORDERS AND HIGHER CATEGORIES ; Z.N.(S.) 360

The Nomenclature Committee of the Society of Systematic Zoology has not agreed upon a treatment of this subject that is satisfactory to a majority of its members.

I am therefore enclosing copies of the comments received from each member of the Committee who has expressed his views. You will note that the comments of one member are submitted on a copy of Dr. J. C. Bradley's dissertation, and are distinguished thereon by bold type.

Further discussion of this subject by a member of this committee (and by other members of the society) is submitted by way of the minutes of a symposium recently conducted by the Pacific Section of the society. Only that portion of these minutes which deals with Orders and higher categories is enclosed. This material does not constitute a part of the committee's report but is submitted by way of a supplement thereto.

APPENDICES 1 AND 2 TO DR. FOLLETT'S LETTER

Appendix 1 (views of Dr. J. Chester Bradley) and Appendix 2 (views of Professor Robert L. Usinger)

Note : Professor Usinger's views are in the form of comments interpolated at various points in the papers by Dr. Bradley. In the typescript furnished by Dr. Follett, Professor Usinger's comments were distinguished from Dr. Bradley's text by being underlined. They are here so distinguished by being printed in bold type.

Enclosure 1 to Appendices 1 and 2

SUMMARY OF THE PROBLEM INVOLVED IN THE NAMING OF ORDERS AND HIGHER CATEGORIES

THE NAMING OF ORDERS AND HIGHER CATEGORIES : BRIEF SUMMARY OF PROBLEMS*

By **J. C. BRADLEY**

(The Paragraphs are numbered to correspond to numbers used in *Bull. zool. Nomencl.* **7** : 95–108)

5. Shall Order (Class, Phylum) be defined by the type concept ? **Yes.**

* Before reaching any decision, the full statement of the Secretary of the Commission (*Bull. zool. Nomencl.* **7** : 97-118) should be studied. [J.C.B.]

If so, should the type unit be

(*a*) a type-family (except in the case of Orders not provided with Families, in which case it would be a type-genus, to become automatically type-genus of type-family when Families are established) ?

(*b*) a type-genus, with provision that the latter be also type-genus of each successive nominotypical sub-unit ? **Yes.**

6. Uniform termination for orders in all phyla would cause wide-spread changing of established names. Should they be provided for some groups, where desired, ex. gr. Aves where " -iformes " is used by general consent ? **No uniform terminations except when authorised in special cases (Aves) by Commission.** If so, where an order is transferred from the Class, should it retain its termination or be deprived of it ? **Retain.**

7. As in the case of the names of Families, Sub-Families and Tribes, names of Orders, sub-Orders and minor divisions (this probably means above Super-Family) should be co-ordinate. Should names of Orders be co-ordinate with those of Classes (in view of the tendency to advance Orders to rank of Class), and therefore to avoid much name-changing ? **Yes.**

8. Prior to 1850 it would be very difficult to apply any definition of publication to an Ordinal Name. Shall we apply one definition to this early period, a second to more recent work, and a third to publication after the adoption of legislation ? **Not too difficult, one definition prior to new rule, one after.**

9. It would be impractical to apply priority to all Ordinal Names. Shall we apply three standards, paralleling the suggestions in paragraph 8 ? **No ; standards as elsewhere in rules : priority or appeal to Commission in difficult cases.**

10. Shall the scheme for emendation of Families be applied also to Ordinal Names ? (No advantage would ensue from a different set of principles.) **Yes.**

11. Although nominotypical sub-units of Families, genera and species bear tautonymous names, this has not been customary for Orders, Classes or Phyla and to require it would be strongly objectionable. **Yes.**

12. Should the citation of the names of authors be recognised in the *Règles* as correct ? **Yes.**

13. A stop must be put to homonymy between Ordinal Names (as Decapoda in Crustacea and in Mollusca). It is suggested that such cases, if now existing, be referred to the Commission, but that priority should apply to cases of homonymy arising after the enaction of a regulation. **Priority unless appealed to Commission.**

14. It is suggested that the provisions proposed to apply in case of families should govern cases of names of Orders and similar categories that are very similar but not identical. **Yes.**

15. It has been recently suggested that names already published for Orders or higher categories should not be available for genera, at least in the Order concerned. **A Recommendation only !** Any provision must prevent a new generic name from invalidating an established Ordinal name or *vice versa*. **Of course ; they are not co-ordinate.**

16. Names of Classes and of Phyla should be treated under the same principles as those of Orders, and defined respectively in terms of types. It seems desirable to make names of Classes and Phyla co-ordinate. **Yes.**

17. In many instances Ordinal Class and sub-Class names are based on the same word, with slightly different termination. It is suggested that the advantages of a change in this respect would be outweighed by the disadvantages. The principle is well-established in case of families, subfamilies and tribes. **Yes.**

18. An Official List of the Names of Orders and Higher Categories and an Index of Rejected Names will be necessary. Each name should appear as published, irrespective as to whether it is currently applied to a higher or lower co-ordinate category. Second names (with different types) should be added to the list as available for those who consider that the types belong to different Orders, etc. **Yes.**

19. It will be difficult to date names currently assigned to Ordinal (or co-ordinate) names that were published prior to about 1850. It will also be difficult to establish a method for determining types of groups already established.

(*a*) Under alternative solution 1, definite rules would cover all problems. The law of priority would be applied to Ordinal (and co-ordinate) names, and the type would be the originally included unit originally designated or first selected. The Commission would be empowered, on application, to vary the law in particular cases to conserve usage.

(*b*) Under alternative 2, the scheme would differ only in application of Law of Priority and method of determining types. These would not be subject to set rules. In their stead the Commission would be authorised, on application, to determine the names to be applied to Orders, Classes and Phyla by authors who recognise the group involved as taxonomically required. The Commission would at the same time determine the types. The Secretary feels that the second alternative would avoid risk of undesirable disturbance of names.

19 (a). By all means

Enclosure 2 to Appendices 1 and 2

COMMENTARY ON THE PROPOSALS RELATING TO THE NAMING OF ORDERS AND HIGHER CATEGORIES SUMMARISED IN ENCLOSURE 1

Note : As in the case of Enclosure 1, the main text of the following document is by Dr. J. Chester Bradley, the views of Professor Robert L. Usinger being in the form of interpolated notes ; these latter are distinguished by being printed in bold type.

COMMENTARY AND RECOMMENDATIONS

By J. C. BRADLEY

(a) It is perhaps unintentional that no account is taken of Super-Order, Sub-Class, Super-Class and Sub-Phylum. These are essential to flexibility and should be legalised for use wherever authors wish to employ them. **O K.**

(b) So far as names prior to about 1850, and probably (at least as far as possible) so far as all up to the present are concerned, plan 19b is strongly preferable. I recommend going further. I think it would be practicable, more efficient, and in the long run save much difficulty if the Commission were to undertake, prior to 1958, to select the name to be accepted, and the type to be assigned it, for each Order, Class and Phylum as well as intermediate category of animals. This should be accomplished by inviting a committee of specialists in each major group to prepare and submit for adoption a recommended list of names within their field. It should be understood that first consideration should be given to current usage, second to length of usage, and when these afforded no clear basis for choice, to other considerations (such as priority) that should be specified. The names must not be illustrative of any particular taxonomic scheme, but must provide, so far as practicable, an available name for every taxonomic group of Ordinal or co-ordinate rank that has been proposed, even though many, or the majority, or even all authors consider many such names to be subjective synonyms of others. By careful selection of types, any of two or more names for the same Order or other category can be disposed of by being made objective synonyms, or made subjectively available, even though supposedly a synonym, for those who consider their types to belong to different groups of the same rank. In selecting types attention should be paid primarily to selecting those that are taxonomically most central and hence least liable ever to be removed on taxonomic grounds from the groups to which the names they typify are normally understood to apply. It would seem desirable to provide that disqualifying a name for use at one level need not necessarily disqualify it at another. The usefulness of this can be illustrated by an example : The names Plectoptera and Ephemerida are each in use for Mayflies. There are three Sub-Orders of fossil Mayflies and one Sub-Order of recent Mayflies. In my own teaching I employ Plectoptera for the Order, Ephemerida for the Sub-Order containing recent Mayflies.

The list recommended by the committees of specialists would have to be published for consideration by and advice from the zoological public before adoption by the Commission.

In view of the relatively small number of names involved, the co-operative effort proposed does not appear unrealisable. The list should be brought down to the current time and Sub-Orders also included in every major group where it can be done within the bounds of the time and labour that can reasonably be devoted. But a great step will have been taken if, in some groups, it is even brought no further than to 1850. The labour will be greatly lightened in view of the fact that a bibliographical history of each name is not essential, since usage rather than priority is to be paramount. If the list in some groups cannot be brought to completeness, to the extent of including all objective or even all subjective synonyms, at least the major objective will be attained if a valid name can be established for all groups which it is foreseen are likely to be required. The other details could be filled in later, from time to time, with no appreciable loss of effectiveness.

Rules involving priority can be and should be laid down to cover the future, as the Secretary has proposed.

I prefer 19a

[Words in bold comprise the comments of Dr. Robert L. Usinger.]

COMMENTS ON THE NUMBERED PROPOSALS

5. Definition should be by type. Principle (*b*) is clearer, involves no exceptions, sacrifices no advantage. It is more logical because it begins with one unit as base and carries it right through to the top. It would be more complex to define Order in terms of Family, Family in terms of genus, Class in terms of Order, Phylum in terms of Class, although the actual result is the same.

6. Uniform terminations in all Phyla are not practicable. There is no objection to providing them for certain groups where overwhelming sentiment demands them. A name transferred into such a group, or from one such to another, should assume the required termination.

7. From Sub-Order to Phyla names should be co-ordinate, but the suppression of a name at one level should not necessarily forbid its use at another.

8-9. Unnecessary if the plan suggested in paragraph (*b*) above is followed.

10. It seems desirable that the same principles in regard to emendation should govern both Family names and those of Orders and co-ordinate groups.

11. Agreed.

12. Yes, but optional. The citation should refer to the original author of the name and *not* to the scope to which some author, original or later, has applied it. The latter usage is very common.

13. Agreed.

14. It seems desirable that the same principles should be applied here to both Family and Ordinal names and their co-ordinates.

15. Suggestion good, qualification agreed to.

16, 17 and 18. Agreed.

19. Second alternative preferred, if the scheme provided by paragraph (*b*) of these comments cannot be adopted.

APPENDIX 3 TO DR. FOLLETT'S LETTER

Comments furnished by **CURTIS W. SABROSKY**

REACTIONS ON NAMING OF ORDERS, ETC.

My initial reaction to this subject, both before and after reading Secretary Hemming's report, is general opposition to the whole proposal for inclusion of the subject of names of Orders and co-ordinate and higher categories under the International Code. I would much prefer, and was planning to recommend, that the approach should be through committees of specialists, who should attempt to reach agreement on names that had proved themselves by virtue of usage, usefulness and euphony.

Then I read Dr. Bradley's plan as outlined in his paragraph " b ", and this is so completely in accord with my views that I vote for it enthusiastically as a substitute for the Secretary's proposal (at least for names up to 1958). The plan has several advantages :

(1) It would be a suitable project for the Linnaean Celebration in 1958.

(2) As an important reference work, it would do much to contribute to uniformity, just as the list by A. S. Pearse has undoubtedly done much in that direction.

(3) If " types " are to be established, for Ordinal and higher categories, in many cases only a formality, now is a good time to do it on a comprehensive basis, for relatively few " types " have been established for those categories.

(4) It is necessary, if the suggestion in paragraph 15 (Hemming) is to be at all practicable. Nomenclators do not contain those names, and some comprehensive list is needed.

I may add that the same approach proposed by Dr. Bradley could also be applied to Family names, though the project would be considerably larger. This is the very sort of thing which I had in mind in proposing the preparation of an " Official List of Family Names in Zoology " (Sabrosky, 1947, *Amer. Nat.*, **81** : 159).

COMMENTS ON NUMBERED PROPOSALS

Several of these would not apply if Dr. Bradley's plan were adopted. Otherwise, I agree with Dr. Bradley's comments, except as follows :—

12. No, except for cases where the person discussing them needs to distinguish between them, as in discussing the suprageneric nomenclature of a group. Authorship of genera and all names below them has put enough personal element into the problem. I see nothing to be gained by citing authorship for Pisces, Coleoptera, etc. Even for Decapoda, the need to be specific is more satisfactorily filled by citing " Decapoda (Mollusca) " and " Decapoda (Crustacea) " than by giving the authorship.

13. Agree, but Dr. Bradley's plan would of course cover it for the past.

15. This suggestion seems to me to be impracticable. In order to work, all names of Ordinal and co-ordinate and higher categories would have to be completely catalogued in nomenclators, which they are not. Such a list, though perhaps lacking all the synonyms, could be developed separate from the generic nomenclators if Dr. Bradley's plan were adopted.

APPENDIX 4 TO DR. FOLLETT'S LETTER

Comment furnished by **CHARLES D. MICHENER**

I agree with Bradley, as commented upon by Sabrosky.

APPENDIX 5 TO DR. FOLLETT'S LETTER

Comment furnished by **W. I. FOLLETT**

I doubt that " standardisation " of the highly subjective concept of Orders and higher categories should be regulated by the International Commission, or attempted by " official " specialist groups.

APPENDIX 6 TO DR. FOLLETT'S LETTER

Comment furnished by **HENRY TOWNES**

Any rules for these (*i.e.*, Ordinal, etc. Names) would probably do more harm than good.

APPENDIX 7 TO DR. FOLLETT'S LETTER

Comments furnished by **JOHN W. WELLS**

NAMING OF ORDERS AND HIGHER CATEGORIES

I cannot agree with any proposals to introduce rules for regulating the names of Orders and higher categories, unless they be conditional upon simultaneous establishment of uniform terminations for all categories from Phylum down. This last may be a desirable reform, but, I fear, a lost cause on the basis of the preliminary skirmish in this direction with the *Treatise on Invertebrate Paleontology*. It would be ridiculous to legislate—and the Commission is in no position to jeopardise further its reputation for common sense—on co-ordinate names, priority, dates, emendations, homonymy, tautonymy, citation, etc., unless a perfectly uniform system be set up.

APPENDIX 8 TO DR. FOLLETT'S LETTER

Comments furnished by **JOHN T. ZIMMER**

Z.N.(S.)360. ORDERS AND HIGHER GROUPS

No need for elaborate rules. I prefer an *Official List* of such names which need not have uniform terminations. The changes necessitated would go far beyond zoologists and be confusing.

APPENDIX 9 TO DR. FOLLETT'S LETTER

EXTRACT FROM THE PROCEEDINGS OF A SYMPOSIUM ON ZOOLOGICAL NOMENCLATURE RELATING TO THE NAMING OF ORDERS AND OTHER HIGHER CATEGORIES HELD BY THE PACIFIC SECTION OF THE SOCIETY OF SYSTEMATIC ZOOLOGY AT THE OREGON STATE COLLEGE, CORNWALLIS, OREGON, U.S.A., ON FRIDAY, 20TH JUNE, 1952.

SYMPOSIUM : *Problems of Nomenclatorial Practice Now Under Consideration by the International Commission.* W. I. FOLLETT, presiding.

5. The Possible Addition to the *Règles* of Provisions Governing the Naming of Orders and Higher Taxonomic Categories.

The time that remained was spent in discussing, under the leadership of Dr. Usinger, an aspect of this question on which the advice of specialists is now being sought : Should Orders, Classes, and Phyla be defined by types, and if so, should the type be a genus, or a family, or some other category ?

Dr. Usinger read sections from a plan proposed by Dr. J. Chester Bradley, under which the International Commission would be authorised to prepare master lists of these higher categories and to fix types, presumably at the generic level. Dr. Brittan inquired on what basis the type genus would be selected, whether priority, euphony of name, locality, or some other. Mr. Follett queried the criteria practicable in such matters.

Dr. de Laubenfels favoured retention of the *status quo* unless it could be shown that definite advantages would result from any new arrangement. Dr. Usinger thought that the stability which would result constituted a sufficient

advantage, and cited the variety of Ordinal Names in current use for the insects, no two authors seeming to agree upon the same list.

Dr. Ferris would restrict the proposal to categories of superfamily and below. He also raised the question as to what would constitute priority in the case of an Ordinal or class name. Dr. Usinger admitted the possibility of priority without types, with usage alone as a guide. Dr. Belkin, however, was of the opinion that priority could not be used without the type system.

With such a variety of opinion expressed, and in consideration of the limited information available, it was decided not to take a vote on the proposal. It appeared, however, to be consensus of those present (1) that Orders should not be defined by the type concept ; (2) that no strong opposition to the application of priority was indicated ; and (3) that otherwise the recommendations embodied in Dr. J. C. Bradley's commentary upon Mr. Hemming's views are generally acceptable.

JOHN S. GARTH,
Provisional Secretary

DOCUMENT 4/22

Statement of the views of the

AMERICAN COMMITTEE ON ENTOMOLOGICAL NOMENCLATURE

Enclosure to a letter, dated 24th July, 1952, from

Professor CHARLES D. MICHENER, Chairman

ORDERS (COMMISSION REFERENCE Z.N.(S.) 360)

It is perhaps unintentional that in Mr. Hemming's proposals (*Bull. zool. Nomencl.* **7**, pp. 95–108, 1952) no account is taken of Super-Order, Sub-Class, Super-Class and Sub-Phylum. These are essential to flexibility and should be legalised for use wherever authors wish to employ them.

So far as names published up to the present time are concerned, alternative 2 (in Hemming's paragraph **19**) is strongly preferable. We recommend going farther. It would be practicable, more efficient, and in the long run save much difficulty if the Commission were to undertake, prior to the Linnaean celebration in 1958, to select the name to be accepted, and the type to be assigned it, for each Order, Class and Phylum as well as intermediate category of animals. This should be accomplished by inviting a committee of specialists in each major group to prepare and submit for adoption a recommended list of names within their field. It should be understood that first consideration should be given to current usage, second to length of usage, and when these afforded no clear basis for choice, to other considerations (such as priority) that should be specified. The names must not be illustrative of any particular taxonomic scheme, but must provide, so far as practicable, an available name for every taxonomic group of ordinal or co-ordinate rank that has been proposed, even though many, or the majority, or even all authors consider many such names to be subjective synonyms of others. By careful selection of types, any of two or more names for the same order or other category can be disposed of by being made objective synonyms, or made subjectively available, even though supposedly a synonym, for those who consider their types to belong to different groups of the same rank. In selecting types attention should be paid primarily to selecting those that are taxonomically most central and hence least liable ever to be removed on taxonomic grounds from the groups to which the names they typify are normally understood to apply. It would seem desirable to provide that disqualifying a name for use at one level need not necessarily disqualify it at another. The usefulness of this can be illustrated by an example : The names Plectoptera and Ephemerida are each in use for Mayflies. There are

three Sub-Orders of fossil Mayflies and one Sub-Order of recent Mayflies. It is possible to employ Plectoptera for the Order, Ephemerida for the Sub-Order containing recent Mayflies.

The list recommended by the committees of specialists would have to be published for consideration by and advice from the zoological public before adoption by the Commission.

In view of the relatively small number of names involved, the co-operative effort proposed does not appear unrealisable. The list should be brought down to the current time and Sub-Orders also included in every major group where it can be done within the bounds of the time and labour that can reasonably be devoted. But a great step will have been taken if, in some groups, it is even brought no further than to 1850. The labour will be greatly lightened in view of the fact that a bibliographical history of each name is not essential, since usage rather than priority is to be paramount. If the list in some groups cannot be brought to completeness, to the extent of including all objective or even all subjective synonyms, at least the major objective will be attained if a valid name can be established for all groups which it is foreseen are likely to be required. The other details could be filled in later, from time to time, with no appreciable loss of effectiveness.

Rules involving priority can be and should be laid down to cover the future as the Secretary has proposed.

Another importance of the list, which would be a valuable reference work, is that Hemming's paragraph **15** would be impractical without it.

The following comments utilise the paragraph numbers found in Mr. Hemming's treatment.

5. Definition should be by type. Principle *b* is clearer, involves no exceptions, sacrifices no advantage. It is more logical because it begins with one unit as base and carries it right through to the top. It would be more complex to define Order in terms of Family, Family in terms of Genus, Class in terms of Order, Phylum in terms of Class, although the actual result is the same.

6. Uniform terminations in all Phyla are not practicable. There is no objection to providing them for certain groups where overwhelming sentiment demands them. A name transferred into such a group, or from one such to another, should assume the required termination.

7. From Sub-Order to Phyla names should be co-ordinate, but the suppression of a name at one level should not necessarily forbid its use at another.

8-9. Unnecessary if the plan suggested in paragraph (*b*) above is followed.

10. It seems desirable that the same principles in regard to emendation should govern both family names and those of orders and co-ordinate groups.

11. Agreed.

12. Yes, but optional. The citation should refer to the original author of the name and *not* to the scope to which some author, original or later, has applied it. The latter usage is very common.

13. Agreed.

14. It seems desirable that the same principles should be applied here to both Family and Ordinal names and their co-ordinates.

15. Suggestion good, qualification agreed to.

16, 17 and **18.** Agreed.

19. Second alternative preferred, if the scheme provided by paragraph (*b*) of these comments cannot be adopted.

American Committee on Entomological Nomenclature

CHARLES D. MICHENER, *Secretary*

DOCUMENT 4/23

Statement setting out the views of members of the

COMMITTEE ON ZOOLOGICAL NOMENCLATURE OF THE AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS

Letter, dated 26th July, 1952, with enclosures, from

Dr. W. I. FOLLETT, Chairman

ORDERS ; Z.N.(S.) 360

The Committee on Zoological Nomenclature, of the American Society of Ichthyologists and Herpetologists, at present includes the following members :

Dr. Charles M. Bogert, The American Museum of Natural History, New York City, New York.
Dr. Fred R. Cagle, Tulane University, New Orleans, Louisiana.
Dr. Hobart M. Smith, University of Illinois, Urbana, Illinois.
Dr. Robert C. Stebbins, University of California, Berkeley, California.
Mr. W. I. Follett (Chairman), California Academy of Sciences, San Francisco, California.

This Committee has considered the problems requiring consideration if provisions relating to the naming of Orders and Higher Taxonomic Categories are to be included in the *Règles*. The views of several members of this committee are expressed in the correspondence of which copies are attached to this letter. As a member of another society,* I have already sent you my views upon this subject, and therefore I shall not duplicate them here.

In order to provide you with as many viewpoints as possible, and in accordance with suggestions received from the committee members, I am enclosing copies of correspondence on this subject that I have received from other members of the society.

EXPLANATORY NOTE BY FRANCIS HEMMING, SECRETARY TO THE INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

In 1951 I had some correspondence on the question of the principles which it was desirable should be followed in the naming of Orders and Higher Taxonomic Categories with Dr. W. I. Follett, Chairman of the Nomenclature Committee of the American Society of Ichthyologists and Herpetologists. On 9th August of that year, I addressed to Dr. Follett a letter on this subject which he circulated to the members of the foregoing Nomenclature Committee.

* See the letter dated 22nd July, 1952, written by Dr. Follett, as Chairman of the Nomenclature Committee of the Society of Systematic Zoology reproduced in the present part as Document 4/21 (p. 33).

Of the eight signed statements enclosed with Dr. Follett's letter of 26th July, 1952, five were written on various dates in the autumn of 1951, *i.e.*, at a time when the only statement from the Office of the Commisssion that was available was my latter of 9th August, 1951, and long before the publication in March 1952 of the comprehensive survey of the problems involved in my paper " Problems requiring consideration if provisions relating to the naming of Orders and Higher Categories are to be included in the *Règles* : An Appeal for Advice " (1952, *Bull. zool. Nomencl.* **7** : 95–108). The communications bearing dates in 1951 furnished by Dr. Follett are those received from : Charles M. Bogert ; William A. Gosline ; Robert R. Miller ; Hobart M. Smith (first communication only) ; Norman J. Willimovsky.

Since the comments in the foregoing communications are directed not to my paper of March 1952 but to my earlier preliminary letter of 9th August 1951 and, in some cases, are not intelligible without reference to the former, I give below what I hope will be a sufficient summary of the questions raised in that letter :—

Question (1) : If it is agreed that the concept denoted by an Ordinal, etc., name shall be determined by a " type ", is it desirable that that " type " should be (1) an included family, in cases where families have been established, or (2) in every case, a type genus or (3) some other unit and, if so, what ?

Question (2) : Should the names of Orders and Sub-Orders be co-ordinate with one another (as are the names of genera and sub-genera) ?

Question (3) : What tests should be adopted for determining, as regards the back literature, whether an Ordinal or Sub-Ordinal name has been established ? Is a name published for a group above the family level to be accepted, when not expressly termed an Ordinal or Sub-Ordinal name at the time of publication ? Are such names to acquire priority as from the date of publication and irrespective of the termination employed ?

Question (4) : As regards names given in future, what tests should be adopted for determining whether, in a given case, an Ordinal or Sub-Ordinal name has been validly established ? If the tests to be adopted under (3) above are—in the interests of stability—to be of a lenient character, is it desirable that more rigorous rules should be applied as regards the future ? For example, should the designation of a " type " for the Order or Sub-Order concerned be made an essential condition for the acceptance of such a name ?

Question (5) : If it is considered that it would be desirable to prescribe specified terminations for the names of Orders in parts of the animal kingdom where this could be done without detriment to stability, what steps should be taken to define the group to names in which a given specified termination is to be applied ? Should this be by reference, for example, to the boundaries given to (say) a specified Class in some generally accepted monograph or textbook ? Should

there be provision for the case where a large Class (*e.g.*, Pisces) is later divided into two or more Classes (*a*) that for the restricted Class divided off from the original Class the Ordinal names shall retain the terminations hitherto prescribed for them or should there be a provision under which a new termination could be introduced for the names of Orders included in the restricted Class ?

Question (6) : Should the Code provide means for citing the authorship to be attributed to Ordinal names and the date to be applied to such names for the purposes of priority ?

Question (7) : Should Ordinal names be subject to a Law of Priority similar to that which applies to other kinds of names ?

Question (8) : Is it practicable to devise rules for determining, as regards existing names, how homonymy in Ordinal names is to be avoided and put an end to ? If this is not considered to be practicable, should the Code provide simply for the reference of cases of homonymy of this kind to the International Commission for decision ?

Question (9) : In the case of names published for Orders after the introduction of the new scheme, should homonymy be prevented through the Law of Priority, as in the case of generic names ?

Question (10) : Is it considered that, where, prior to introduction of the scheme, an Ordinal name has been established, the word of which that Ordinal name consists may not validly be used as a generic name and that any generic name consisting of that word is to be rejected ? Is it considered that, where, after the introduction of the scheme, an Ordinal name is published consisting of a word that has already been published as a generic name, that Ordinal name should on that account be rejected ?

Alternative lines of approach : The letter of 9th August, 1951 concluded with the following final question : If the names of Orders and other supra-family groups are to be regulated in the Code, would it be better (*a*) that an attempt should be made to deal explicitly with every situation which might arise, or (*b*), at least as regards names published before the introduction of the scheme, to confine the provisions to a statement of the general principles to be followed in determining the availability of any given Ordinal etc. name, with the addition of a provision that, in any case of disagreement, the name in question is to be referred to the International Commission for decision ? Attention was drawn to the fact that the adoption of the second of these courses would lead naturally to the establishment of an " Official List of the Names of Orders and Higher Systematic Categories in Zoology " and would thus be in harmony with the practice adopted already in the case of the names of lower systematic categories.

APPENDIX 1 TO DR. FOLLETT'S LETTER

THE NOMENCLATURE OF THE HIGHER ANIMAL CATEGORIES

Note by Dr. Follett : This paper was submitted 30th June, 1952, at the request of the chairman of the Committee on Zoological Nomenclature, of the American Society of Ichthyologists and Herpetologists. At the author's request, it is presented anonymously.

By way of reply to your letter of 20th June, I will comment as intelligently as I can on the nomenclature of the higher animal categories.

It seems to me that my ideas have got to be divided into two sections. The first regards the possibility of introducing a uniform system of nomenclature throughout the animal kingdom. Here, I cannot omit emphasising that my ideas merely represent the judgment of one man whose experience is with but one group of animals. You can use these comments in any way you see fit, but I would prefer to have them used, if at all, without reference to authorship and as a means of extracting opinions from others. The second section regards the problem of the nomenclature of the higher categories of fishes. You did not ask me for comments on this subject, but I send them on because I would like to get your ideas on this matter. I sort of suspect that my ideas on this subject are somewhat premature, and that there would be little point in broadcasting them at the present time.

Section I.—*Regarding a Uniform System of Nomenclature for Higher Categories throughout the Animal Kingdom*

There is in the animal kingdom a whole host of Ordinal and other names which are widely and well known and about which there is no confusion. These names, arrived at by a consensus of opinion, fulfil the function of zoological nomenclature far better than a large proportion of the names under the jurisdiction of the International Commission. Even Hemming agrees that such names should not be changed, Then, if we are to apply a uniform system of nomenclature to the higher categories and place this system under the jurisdiction of the International Commission, how far are we to carry it ? Should we exempt, for example, all of the higher insect categories from such a system, or only some of them ? Or again should we exempt some of the names within a category of a given group, say insect orders, and apply rules to others ? In short, where and how do we make exceptions ? Hemming would probably say to send doubtful names to the International Commission for consideration, but this would eventually lead to a consideration of most or all of the names of the higher categories. Now, when these names have all been considered and acted upon, I doubt that the situation will have been improved, but in the meantime what do we do ?

But say that we can work this out and end up with about half of a uniform system, the uniform half being regulated by the International Commission,

what about this regulated half ? What system are we to use for it ? Stenzel's ? I completely agree with Simpson's remarks (1952 : 22) concerning the difficulties of applying this system and have more to say on the subject below. But if not Stenzel's, then what ? Say we work out a system which will not too badly disrupt the names in one animal group, will it be suitable to another ? I doubt it.

But let us say that we have worked out a system that is suitable all round, then what ? Do we apply a type system with a law of priority similar to that in genera, as Hemming suggests ? Simpson (1952 : 21) has pointed out the disadvantages of these features, too, and again I completely agree with him. I would far rather apply the principle of usage, but how does the International Commission rule on usage ? Again, only by establishing a list of *nomina conservanda* which will eventually include most or all of the names in the higher categories.

I quite agree with Hemming that the present anarchy in the nomenclature of the higher categories of some groups (notably fishes) is distressing and reflects widely and adversely on those of us in these fields and on zoologists in general. I do not think, however, that regulations from the International Commission would improve the situation. Rather, I think it is a matter that should be worked out within each group separately by a consensus of opinion of the zoologists working in the group.

As I have said before I think there is much in favour of having different animal groups named in different ways. In the first place I think we could all profit from the experience of workers in different groups in which various systems of nomenclature are used. From this experience we can decide whether any uniform system is advantageous, and if so what system. If the attainment of such experience means delay, why, we have already delayed several decades on the matter, so why rush into it now when we still have little experience with it ? Would it not be better for the specialists in each group to feel their way along in the matter until they reach the best solution for their own group ? And if no uniformity of system is reached for the various groups, is any harm done ? The objective of nomenclature, as I see it, is to be able to let the other fellow know as clearly and as succinctly and as easily as possible what you are talking about. Perhaps, if the entomologists continue to end most of their Orders in *-ptera*, the ornithologists theirs in *-iformes*, and mammalogists theirs with nothing in particular, more is accomplished along this line than would be by applying a uniform system of endings. At least now any zoologist should be able to spot Diptera as an insect group, and no entomologist is confused as to what is meant.

In summary, I believe that the problem of names for the higher categories in many groups exists and should not be shirked, but that is one the specialists in these groups should solve and that regulation by the International Commission would only add to the confusion.

SECTION II.—*Suggestions Concerning the Nomenclature of the Higher Fish Categories*

The following notes have been prepared after teaching a half-year course in fish classification for the fourth time. Whereas the research systematist can often avoid presenting a comprehensible set of names for the higher fish categories, the teacher cannot. These notes, then, have at least the merit of some experience with the subject.

At the present time there are at least three different nomenclatorial practices in use for the higher fish categories. This means at least three names for each Order, Sub-Order, and Superfamily, exactly those levels which must be stressed in any course or general work on fish classification.

According to earlier practice each Order was given a separate name derived from the Greek or Latin. The most recent system, that of Stenzel (*Science*, 1950 : 94) has been approved by members of the A.S.I.H. (*Copeia*, 1950 : 326). According to Stenzel's system the following endings would be uniformly used for each of the higher categories : Subtribe, *-ini* ; Tribe, *-idi* ; Supertribe, *-ici* ; Subfamily, *-inae* ; Family, *-idae* ; Superfamily, *-icae* ; Sub-Order, *-ina* ; Order, *-ida* ; and Super-Order, *-ica*. Berg's system (1940 : 353) is somewhat similar but uses the stem of an included genus as a base throughout these categories, adding the following endings : *ini*[1] for Subfamily ; *-idae* for Family ; *-oidae* for Superfamily ; *-oidei* for Sub-Order, and *-formes* for Order.

During the years that I have been teaching systematic ichthyology, I have tried all three nomenclatorial practices. The results of my attempt to present Greek and Latin ordinal names to students were unsatisfactory. These names meant nothing to the students and had to be learned by rote, thus imposing an added nomenclatorial burden on an already imposing zoological one.

As a result of this experience, Berg's system was tried. Though this system was more satisfactory it had the disadvantages that it was not used in most of the literature and that Berg's ordinal termination was often used by Regan for " Division ". For the more poorly known Orders, e.g., Gobiesociformes (for Xenopterygii), Pegasiformes (for Hypostomides), etc., Berg's names proved to be much easier to learn than the earlier Classic ones, but for the better known orders it was necessary to present both Berg's name and the earlier one, e.g., Clupeiformes and Isospondyli, Cypriniformes and Ostariophysi, etc. In using Berg's system it was probably in the Perciformes *vs.* Percomorphi that the greatest difficulty arose because it is here that Regan makes the most extensive use of the ending *-formes* for his " Divisions " (equal superfamilies).

In 1951 Stenzel's system of nomenclature was used in class. This system had the advantage of shorter names, but an extremely serious difficulty shortly became apparent. If, under Stenzel's system, one speaks of " berycid fishes ", the hearer has no way of knowing whether a Family or an Order (or a Tribe)

[1] Berg (*in litt.*) agreed to change this ending to *-inae* in the revised edition of his " Classification," which he was preparing at the time of his death.

is under consideration[2]. The same sort of confusion arises in speaking of the berycine, or trying to speak of the berycic, fishes. A relatively minor defect of Stenzel's system is that his names have been as yet almost unused in fishes.

From the above experience with the three types of nomenclature, I should like to offer the following tentative suggestions as a basis of discussion. However, before doing so it seems well to reiterate certain of the principles upon which these suggestions are based. It seems to me that a classification should be expressed in as easily assimilable a manner as possible. If two names denote a group equally well and other things are equal, the one which is more easily learned should be used. Of course, other things are rarely equal. The more difficult name may be much more deeply embedded in the literature, and often is in fishes. Thus, the feature of assimilability must be balanced against usage. In fishes, however, usage has rarely been consistent, so that this aspect plays a much lesser rôle than in certain other groups, for example, insect Orders. In fact the present, with its three types of nomenclature all in use, would seem to be an excellent time to emphasise the feature of assimilability and to do what changing needs to be done to improve the nomenclature of the higher fish categories.

There are not now, and I hope never will be, rules which say how the names of the higher fish categories should be formed. If this holds we can follow whatever system or lack of system suits us best. And if we decide on a system, I see no crucial objection to making exceptions, providing we can reach a consensus of opinion as to what exceptions to make. The important point to me is to set up the best names we can for the higher categories of fishes, to reach some agreement as to what names these are, and to use these as consistently as possible.

With these matters in mind the following suggestions are made :

For Orders of rare or little-known fishes I would advocate that either the ending *-formes* or *-morphi* be added to the stem of an included genus. (One can speak equally well of beryciform or berycomorph fishes, and both endings have been used for fish Orders.) I would advocate that the stem (for Orders and all other categories dealt with below) be based on a well-known genus and that usage and consensus of opinion, nor priority, determine what the stem should be.

For Sub-Orders either of the terminations *-oidea* or *-oidei* would appear acceptable, providing the termination *-oidae* or *-oidea* is not used for superfamily.

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[2] This difficulty does not arise to nearly the same extent under Berg's system, where one can speak of the beryciform or berycid, but unfortunately not berycoid, fishes with relative clarity as to what systematic level is meant.

Simpson (1952 : 22), however, emphasises the confusion that results from having as many as six taxonomic levels all with the same stem. I believe that this is an advantage rather than a disadvantage, and that more confusion would arise from having to learn several different stems than from having to learn to distinguish once and for all six different endings on the same stem. Fortunately, the instances when such a situation would arise are no more numerous than the number of orders, and even in the great majority of fish orders all of these taxonomic levels are not used.

For superfamilies I have no preference for terminations. The ending *-icae* of Stenzel is perhaps worth considering. For other systematic levels, terminations are either not needed at the moment or have already been designated by the International Commission.

There remains then the problem of certain well-known Ordinal names. Consistency in applying any system of nomenclature holds certain, though not to my mind overwhelming, advantages. Among recent fishes I would be very willing to make exceptions for the following Ordinal names :

Euselachii for the modern sharks	Ostariophysi
Crossopterygii	Anacanthini
Dipnoi	Heterosomata
Isospondyli	Plectognathi[3]
Iniomi	

I do not believe this list should be greatly amplified, and if it were diminished or eliminated I should have no objection.

As to the names of fossil fish groups, whether any or all of them are made to conform with the system advocated here I would prefer to leave very largely to the paleontologists.

Below the Ordinal level, I see no reason for making exceptions. Above the Ordinal level, I see no point in systematising fish nomenclature.

In closing, I should like to call attention to two individual cases. One is the use of Agnatha for a superclass by the A.S.I.H. (*Copeia*, 1950 : 326). If Agnatha is to be used for a superclass then what name is to be used for the class ? To speak of the fourth fish class as the " monorhines ", as apparently advocated by the A.S.I.H., doesn't seem very satisfactory. However, I have no suggestions to offer in this regard that *are* very satisfactory. I shall perforce use agnathans both as a class and a superclass. Perhaps some modification of the name Agnatha could be made for its use in the one category or the other.

The second name that worries me is that of the Order to which the modern sharks (as opposed to the skates and rays) belong. The name Selachii has been kicked around so much as to have become ambiguous. My best idea here is Euselachii.

APPENDIX 2 TO DR. FOLLETT'S LETTER

Statement, dated 11th October, 1951, furnished by **CHARLES M. BOGERT**

The following is in reply to your letter of 21st September with reference to Project No. 5, namely, the problems concerned with the names of higher categories. As on previous occasions, I have discussed the various questions with other members of the Museum staff here. On the whole, we think that the statement by Mr. Hemming is sensible and constructive. In some instances

[3] Apodes is not on this list because it is objectionable on two grounds. First, certain unrelated fishes have at various times been placed under this name, e.g., Kaup's "Apodal Fishes". Second, the name is too similar to the Apoda of Amphibia.

technical details are put ahead of principles, and the language is sometimes legalistic to the point of being obscure, but we would comment on the questions raised as follows, taking them up in order :

(1) With reference to taxonomic categories above the Family level, I can see no objection to having a type genus for each. As I see it, it is actually immaterial whether a type family or a type genus is chosen as long as it is clearly stated which zoological object is considered as the typical representative of the group in question.

(2) In the case of Orders and Sub-Orders, the names should not be co-ordinate. A name proposed as a Sub-Order should not, on promotion, take precedence over a name later proposed for the Order. If it were, this might well be made the starting point for a terrific upheaval on the excuse of priority, which Hemming himself rules out in subsequent statements.

(3) Latinised names used to denote groups above the Family level should be treated as though they had been published as Ordinal or Sub-Ordinal names. Hence they should have priority over names later proposed as such, even though the latter may definitely have been identified as being Ordinal or Sub-Ordinal. After all, the whole concept of the Order came into being gradually, and it would be nonsense to become legalistic about it at this belated date. This threatened upheaval might perhaps be avoided if there were some sort of preamble to the statement concerning higher categories to the effect that " higher categories are of the greatest importance not only to specialists, but also to all other biologists and even to the laymen. A change of well established names of higher categories merely for the sake of consistency or priority would be intolerable and do untold harm to the prestige of systematics. Well established Ordinal names, if their author is to be determined, may be traced back to the first usage of the stem of his name as a higher category, regardless of the ending used by the author originally ".

(4) Vigorous provisions might well be inserted in the Code, specifying the procedure to be followed if a name for a higher category is to be proposed. It might, for example, be demanded that the name of a new Order be valid henceforth only where introduced by a statement specifically designating it as a new Order.

(5) Any rigid rule for determining the special termination to be used in forming a new Ordinal name might well result in chaos. The name or status of an Order should not be affected if it is transferred to a different Class. In the case of subdivisions of existing groups, the name for each subdivision when advanced to a higher category, should not of necessity have the ending changed. The substitution of a new (and for each group a uniform) ending will inevitably result in the duplication of many generic names in the higher categories. Hence, it would seem preferable that specialists be given some leeway.

(6) The Code might well provide some means of citing authorship and date for names of Orders, but there is no necessity for any provision to indicate that the name, as originally published, had an incorrect termination. If need be, the author can cite the original spelling in parentheses, but any rule

requiring this would place an unbearable burden of bibliographic search on every user of Ordinal names.

(7) With reference to Ordinal names and the law of priority, those now in general use should not be jeopardised by any rule concerning priority. However, it might well be stated that Ordinal names introduced after a specified date will be subject to priority, with possible exceptions arising from conflicting names when Orders are combined.

(8) Questions concerning homonymy in Ordinal names should be referred to the Commission for decision after consultation with specialists in the groups concerned.

(9) The availability of Ordinal names published after the introduction of any scheme should be determined by applying the law of priority.

(10) Thus far no two people have read the section dealing with homonymy between Ordinal and Generic names and arrived at the same interpretation. Hence, the suggestion does not meet with general approval since it is not generally understandable. If the question is primarily concerned with conflict between Ordinal and Generic names, there may be need for concern. As a result of setting up unifor mendings for each category above the Family, a good many generic names will be duplicated in those for the higher categories—to judge by the set of names gotten out years ago by Pearse's Committee (and as noted under (5)).

(11) Hemming's draft omits the important question of the procedure to be followed when Orders are combined. Priority should not be the deciding principle in the case of such well known groups as Orders. When there is a conflict of two Ordinal names caused by combining two Orders, the name of the better known one of the two should be chosen. In most cases this would be the name of the larger of the two combined Orders. In cases of doubt, the matter could be settled by the Commission.

To eliminate all further wrangling concerning the names of categories higher than the family, it is suggested that the International Commission publish a list of such names. In view of the fact that it is often difficult to get authoritative lists for some Classes or Phyla, it is further suggested that such a list be published piecemeal.

As far as the question of endings is concerned, we would suggest a policy as liberal as possible. It seems virtually impossible to reach any agreement among specialists as to the ranking of higher categories. In ornithological circles, for example, Wetmore recognises about 20 Orders, Streseman 49 Orders, whereas Mayr and Amadon, who are quite as authoritative as the others, recognise only 29 Orders. These Orders are to a lesser or greater degree subdivided into Sub-Orders and combined into Super-Orders. No two authorities use the same ranking for the same units. Incidentally, Hemming is quite mistaken in his belief that the ending -formes is universally used by ornithologists. It isn't, and the use of uniform endings makes a continuous shifting up and down of the units involved even more confusing.

APPENDIX 3 TO DR. FOLLETT'S LETTER

Statement, dated 26th September, 1951, furnished by
WILLIAM A. GOSLINE

By way of preamble, I look upon Linnaean nomenclature as merely a tool to zoological work. As such it diminishes rapidly in effectiveness with increase in the amount of time necessary to master the use of it. Because of this, Rules of Nomenclature should be kept to a minimum.

Regarding the names of the various systematic levels, I feel that they belong in three indistinctly defined categories. The highest—Kingdom and Phylum—are the province of the general zoologist. There are relatively few names here, mostly of long standing, and these names, if satisfactory to zoologists, should be maintained. The application of systems or rules of nomenclature to these categories is gratuitous.

At the other end we have genera and species. These are legion, and without the application of the rules there would be endless duplication and confusion.

In between are the categories under discussion, centred around Order. These are neither well known to the general zoologist nor so numerous that there is much duplication of names. (The instances where there is duplication could be worked out individually if this were felt necessary.) Since there is no great problem raised by whatever is done, why not let the specialists in the individual groups take care of the Ordinal (Sub-Ordinal, etc.) names of their groups in any way they see fit ? If the problems of Ordinal naming in all groups were similar, a uniform method of naming all Orders might be to advantage. But they are not. Each zoological group has its own problems of Ordinal nomenclature depending upon the number of Orders in the group, the stability of these Orders, the stability of the names used for these Orders, and the number of workers in the field. Consequently I feel that to try to apply a single set of rules or a single system to all Ordinal names would merely cause immediate confusion without adequate compensation in the long run. Besides, as a zoologist I rather like the use of different systems in different groups ; the ending *-ptera* for example immediately indicates to me that an Order of Insects is involved, etc.

I suspect the earlier Commissioners were silent as to rules for the naming of higher categories for reasons very similar to those advanced above, and not, as Hemming writes, because " at the time when the Règles were established, the task of grappling with the problems involved in nomenclature up to Family level were such as to leave zoologists with insufficient energy to tackle the problem of the nomenclature of the higher categories ".

I do not mean to imply that there is nothing the Commission could do to alleviate certain nomenclatorial problems in the higher categories.

APPENDIX 4 TO DR. FOLLETT'S LETTER

Statement furnished by **CARL L. HUBBS**

UNIFORM GROUP ENDINGS

In his judicious and forceful discussion, " For and Against Uniform Endings in Zoological Nomenclature ", in the opening number of *Systematic Zoology* (pp. 20–23), George Gaylord Simpson pays particular attention to the recent proposal by H. B. Stenzel (*Science*, **112**, p. 94, 1950) that nine uniform name endings be adopted for Ordinal (-ica, -ida, -ina), Familial (-icae, -idae, -inae), and Tribal (-ici, -idi, -ini) groups. That proposal is so alluring in its simplicity, consistency, and logic as to inspire, on first thought, agreement and adoption. It received support, for example, from the American Society of Ichthyologists and Herpetologists at its 1951 meeting, particularly from the ichthyologists present, the writer included (the herpetologists were particularly opposed to the abandonment of their relatively few and well-known Ordinal names).

On more thoughtful and analytical consideration, Simpson points out how confusion and even error might well arise from the acceptance, for groups of different rank, of names so very similar as Hominica, Hominida, Hominina, Hominicae, Hominidae, Homininae, Hominici, Hominidi, and Hominini. I would like to bring to the attention of systematic zoologists a more definite defect of Stenzel's proposal, namely, that it would deprive us of the use, now frequent and desirable, of definitive group names in adjectival and derived substantival form, or would throw such usage into hopeless confusion. Thus, if we should write about " poeciliid " fishes (or gonopodia, or life-history), or of the distribution, genetics, or anatomy of the " poeciliids ", it could not be known, under the system advocated by Stenzel, whether reference was to the Order Poeciliida, the Family Poeciliidae, or the Tribe Poeciliidi. Under the current system we write about cyprinodonts (or poecilioids, or microcyprines), poeciliids, and poeciliins, when referring respectively to Order, Family and Tribe (the subfamily adjective is poeciliine).

It would, of course, be possible to devise a system of uniform group-name endings, through at least the Ordinal series, that would be less confusingly alike and that would permit the derivative of distinctive adjectives (and of the corresponding vernacular substantives). Objections raised specifically to the system of Stenzel could thus be avoided. Other objections, such as that of supplanting literature-filled and familiar group names, would remain. An additional and fundamental disadvantage of the Stenzel proposal, or of any similar system of boxing the zoological compass, seems to me to be the inherent emphasis on group ranking, which I regard as a particularly subjective, superficial, and inconsequential (though perhaps unavoidable) aspect of taxonomic work.

APPENDIX 5 TO DR. FOLLETT'S LETTER

Statement, dated 10th October, 1951, furnished by
ROBERT R. MILLER

HIGHER CATEGORIES

It seems to me, in view of the action that has already been taken by the American Society of Ichthyologists and Herpetologists' Committee on Fish Classification (*Copeia*, 1951, No. 1, p. 111) and by the Society itself (as reflected in the June 1, 1951, ballot by our Committee), that there are two phases to this problem. One is what recommendations does the Committee on Zoological Nomenclature have to make for the major group PISCES, and the other is what recommendations are in order for the whole field of Zoology. I will take up these phases in order.

Evidently it has been pretty well agreed (1) that American ichthyologists and herpetologists propose to form higher categories, from Sub-Tribe through Super-Family, by adding the appropriate Stenzel ending to the stem of the type genus of the type family and (2) that the names of Orders, Sub-Orders and Super-Orders are to have their appropriate Stenzel endings but what these are to be tacked on to is not clear. Why the Commission asked Hemming to consider only the nomenclature of Sub-Orders, Orders and higher categories (and not those down to Sub-Tribe) I am not certain.

Hemming's point that terminations decided upon for Sub-Orders, Orders and higher categories need not and will not be identical throughout the animal kingdom is down-to-earth reasoning. I would strongly oppose, for example, changing the name Coleoptera to Scarabaeida, and I can therefore well imagine how entomologists would feel about such a change !

My feeling is that this whole problem would be gratifyingly simplified by employing the stem of the type genus of the type family throughout fish classification. And I think further that if the members of the ASIH had been aware of the headaches in store for the poor nomenclaturalist if a single stem is not used for all categories, the membership would have voted affirmatively on this point in the recent ballot. For example, if we follow Berg's selection of the genus *Clupea*, family Clupeidae, as the type genus and family for the Order Isospondyli, or *Cyprinus*, family Cyprinidae, for Ostariophysi our headaches are cured. For now we need not fret over such horrifying prospects as outlined in items 2–4 and 6–10 of Hemming's letter. Thus we would not have to be concerned over priority in the naming of higher categories or whether Orders and Sub-Orders should be co-ordinate, etc. This system, if adopted by the majority of ichthylogists, would of course solve only our (the fish people's) problems. For other zoological groups, I comment on Hemming's suggestions below.

In order to determine, for nomenclatorial purposes, the identity of higher categories (Sub-Order on up), I recommend that every such group have a type

family in groups where families are recognised and a type genus in other cases (item (1), choice (1) of p. 2 of Hemming's letter).

I would not favour strict co-ordination of Ordinal and Sub-Ordinal names. Thus a name proposed for a Sub-Order in 1850, if elevated to Ordinal rank in 1880, should not displace (take precedence over) a name published for the same group in 1860, particularly if the latter name is in general use. I agree with George Myers (Circular 2, Committee on Fish Classification, February 1950) that no widely accepted current Family or Sub-Family name (and on up through Orders) should be displaced by a more obscure one. The Law of Priority should hold except in such instances. In other words, I favour only a partially operative Law of Priority. (Hemming, item (2).)

If Latin or latinised words used in the older literature to denote groups above the family level are clearly demonstrable as referring to a particular category (Order, Sub-Order, etc.), even if that category is not so designated, I am in favour of recognising such names as available. (Hemming, item (3).)

My feeling is to favour Hemming's proposal in item (4), that a type genus (or family) should be designated by the author publishing a new Ordinal or Sub-Ordinal name—after the effective date of the new scheme.

Item (5) is already answered above, with the recommendation that ichthyologists use the Stenzel system throughout. I think that the shifting interpretation of classes, as the " class Pisces " is largely academic, is zoological, and is beyond the intended jurisdiction of the International Commission on Zoological Nomenclature.

Item (6) is definitely not recommended for fishes (by which term I include fish-like vertebrates). I'm not certain about other groups though I am inclined to register a " no ".

With respect to item (7), regarding Ordinal names and the Law of Priority, I don't feel that such a law should be put into effect here as there would be so many exceptions to it that would have to be made that the " law " would be very ineffective. Moreover, the Commission would have to be petitioned for each exception, thus burdening both that body and zoologists and reducing the effectiveness of the Rules.

Item (8) depends, in part, on whether zoologists feel that homonymy is undesirable in family and other names below the level of the Sub-Order. Personally I feel it best to eliminate homonymy in Family names but question the desirability of this for Ordinal names.

My answer to item (8) automatically provides for an answer to item (9).

The problem brought up in item (10) is more fundamental. Of course, if ichthyologists adopt the type genus concept plus Stenzel's endings for all categories above the genus, we have no further worries, except that would we not then violate Hemming's point (*b*) ? I would not want to see a new generic name proposed which was the basis of an already existing Ordinal name,

particularly if the new generic name was not proposed in the same order. This sort of situation should be guarded against.

In Hemming's section "*Alternative lines of approach*" (pp. 5–6 of his letter), I find his proposal of an "Official List of the Names of Orders and Higher Systematic Categories in Zoology" much the more attractive of his two schemes.

This whole problem, as Hemming freely admits, is most complex and difficult and, unfortunately, there is not a great deal of time left to consider it with the care it deserves, for the Copenhagen Congress will all too soon be upon us.

APPENDIX 6 TO DR. FOLLETT'S LETTER

Statement furnished by
HOBART M. SMITH

Enclosure 1 to Appendix 6

Letter dated 7th November, 1951

HIGHER CATEGORIES

The overwhelming complications, lack of any very obvious solutions, and my lack of prior opinion have caused me to procrastinate a reply to your letter of 21st September. If committee progress has been delayed because of this, the reply herewith will release you from obligation to wait still longer.

The task of laying down rules governing Higher Categories seems a hopeless one. The prospect of the never-ending bickering that would be sure to follow attempts to establish rules of procedure offers little inducement to change from our present system, without rules, of playing follow-the-leader.

Stability of names—the objective in the present investigation—is not going to be achieved even at best in those groups (and there are many) in which the number and relative position of major categories is not yet convincingly established. Rules could be worked out that would benefit certain Classes that are well known (perhaps Aves only?), but whether they would be the most practical rules for other groups could not be known until the problems were known—and they would not be known until the groups that should be recognised are worked out.

Rather than try to anticipate every problem that may arise, when after all these names will tend more than species and genera to be individual cases

meriting separate examination, why not simplify matters by establishment of an Official List as Hemming suggested ? This should be done in co-operation with specialists in each field, and as they agree themselves upon the names desired. Names entered in the Official List for one group should have priority over homonyms brought forward in other groups, so duplication will be avoided. Specialists should be advised to let their choices be governed by a series of *recommendations* (not rules), some of which might be :

1. Higher categories are to be considered completely independently of each other. Sub-Ordinal names are not, for example, interchangeable with Ordinal names. The taxonomic equivalence of generic and subgeneric names thus should not apply to similar combinations of higher categories, simply because of the frequent shifts of rank that has occurred in higher categories.

2. No names not clearly used at the rank at which they are now to be recognised are to be considered. Old group names of uncertain rank are not to be considered unless they have been later adopted for a specified rank ; they are then to be treated as of the latter date.

3. Terminations need not be consistent within any one group, although uniformity should be attained insofar as is painlessly possible.

4. Authors of higher categories should be determined as of the earliest use of the name at any rank now recognised. Use at a rank now recognised should not invalidate it. Original use should establish priority for rank—the name should not be used for a Sub-Order, for example if it was first proposed for an Order.

In conjunction with establishment of the *Official List* the following simple rules might be desirable :

1. Type families, etc., for higher categories need not be established. If the original author designates them, they should be recognised, but not otherwise. When a group is split, retention or rejection of the original name for any of the resultant groups should be decided by common usage, or in future practice by submission of the proposed allocations to the Commission for inclusion on the Official List.

2. Future authors should be required to designate types for the higher categories they may propose.

3. Homonyms in higher categories, in existing names, should be eliminated by priority of acceptance by the Commission for the Official List.

4. New homonyms should be eliminated in like manner.

5. Ordinal (and higher category) names identical with recognised generic names should arbitrarily be altered in termination so as to differ in spelling from the genus, as for example if there were both a genus and order Apoda the Ordinal name might be changed to Apodina.

Enclosure 2 to Appendix 6

Letter dated 14th July, 1952

NAMING OF ORDERS AND HIGHER CATEGORIES

All of the items received with your letter could, and should, receive Mr. Hemming's attention, providing their authors agree. Since no general agreement or statement by our committee has been achieved on this topic, however, I suppose it would be best to submit these items as solely personal statements of the originators. The members of the committee are in a position to offer personal support for any one or more of the items, and I suppose these should be passed on.

In general, I agree with the sentiment of the three items you sent. Yet I do not care to admit complete approval of all of any one, and it would be useless to treat the parts of each in detail. Instead, I would like to suggest that we need now a plan of procedure which will make possible an orderly, if slow, progression toward a satisfactory solution.

As a mode of operation, it seems to me that the first objective should be a determination of the ideally most desirable endings for higher category names. This should be done with no intent of a universal or even general application of the selected endings. As part and parcel of this selection, a decision should certainly be made on the controversial but very important topic of the nature of the type, if any, for each category.

Secondly, upon the premise that an even general application of (1) would be undesirable (which has been admitted seemingly by everyone) and that a real contribution toward stability and practicality is the desired end (admitted perforce by all, with or without tongue in cheek), let only those names or groups of names be arbitrated that the specialists in the groups concerned agree need rectification.

Thirdly, a mechanism for motivating consideration of the questionable names or groups of names should be determined. I suggest that only when a group of five specialists from one or no more than two countries requests the Commission to arbitrate the names can they be considered by the Commission ; that only if 10 other specialists from at least five other countries approve the announced possible arbitration can actual steps be taken to arbitrate ; that a committee of specialists agree upon one or more alternatives in the controversy to be voted upon by the Commission ; and that selections by the committee, and final choice by the Commission, be guided as much as possible by the endings selected under step (1) described above.

Fourthly, an official recommendation, but not requirement, should be made by the Commission that all newly proposed names parallel as much as possible the endings selected in step (1) above.

I suspect that these suggestions are not particularly appropriate, and if so by all means suppress or use them as you desire. If appropriate, you of course have my permission to pass them on to Mr. Hemming.

APPENDIX 7 TO DR. FOLLETT'S LETTER

Statement, dated 2nd November, 1951, furnished by

NORMAN J. WILLIMOVSKY

The following notes were abstracted from the tape recordings made during our impromptu meeting last Friday. These, as you will remember, all concern Project 5 (higher categories). More specifically, the first of the remarks apply to Hemming's letter dated 9th August, 1951. The second set of remarks merely apply to the subject as a whole because the group decided to have the committee prepare a new report on the topic.

Question 1.—For the purpose of identification of taxonomic categories, it was decided definitely that a type was to be specified. Hubbs contended that the type should be chosen from the next lower category employed in the group, whereas Myers preferred that, in each case, a genus be made the type.

Question 2.—It was generally agreed that in the case of Sub-Orders and Orders the names be designated as co-ordinate (as in the case of species and sub-species) inasmuch as it is usually impossible to determine at just what nomenclatorial level a group name was originally proposed.

Question 3.—The means for determining when an older group name has been established: Myers stated on the basis of personal experience, that a committee who have a knowledge of both the fishes and the nomenclatorial practices of the authors under consideration would have to decide just when the various group terms were established and to what nomenclatorial level they pertain.

Question 4.—Means for determining when a name has been established in the case of future proposals: the only conclusion reached was that after a given date, *if* the type system be employed, a new provision be instituted in the International Code, which requires an author to state what taxonomic group forms the type of his new name.

Question 5.—On the basis of Follett's analysis and interpretation of this question, it was generally agreed that there be no need to indicate changes in the contents of a systematic group by placing its author's name in parentheses, etc. This was largely decided because of the difficulty in determining what is included in a particular group when such a name is employed in a faunal list.

A general principle was discussed in connection with Question 5, namely, it was generally agreed that no matter how much a systematic group be split up, the original name should always refer to a group which contains the original nucleus (e.g. *Beryx* should always be a part of the group designated Berycomorphi).

Questions 6–11 were unanswered.

General considerations.—One of the first questions to be decided is whether priority or usage should be employed with regard to the higher group names. Hubbs suggests priority except where confusion will result. It would be a degree of priority as opposed to wholly custom. The results of a poll of the SSZ should be examined on this question. Myers suggested that committees be established to decide the question of priority or usage. These specialists would act as " lower courts " and only in disputed cases would their decisions be referred to the International Commission. Thus the Commission would not be bogged down with endless paper work. This plan was generally conceded the most logical manner of handling the problem inasmuch as Hubbs and Follett showed concern over Hemming's choice of specialist groups.

The problem of uniform endings for higher groups was also raised. Hubbs expressed the following disadvantage of the Stenzel system—the impossibility of forming distinct group adjectives in the English and German languages (e.g. scorpaenine for subfamilies, scorpaenid for families, etc.). Myers voiced the disadvantage that certain subordinal names would be spelled the same as generic names, thus requiring a listing of the actual category in systematic papers. (*Percina* would be name used for the genus and the Sub-Order.)

There was considerable discussion by all the members (principally Follett) over the validity of the results of the Society's vote concerning the naming of higher categories. Consequently no decision was reached by the group present concerning the use of the stem of a type to be employed in the naming of higher groups. It was decided to put the question of what type should be used for a higher group name before the A.S.I.H. Committee on Nomenclature. The viewpoints of Myers and Hubbs to be clearly expressed in the presentation of the problem. Hubbs and Myers both restated their cases for this purpose.

Myers' statement.—A committee be appointed to go through the older literature to examine each name and decide to which nomenclatorial level a group name belongs. It would be easier to then take a central genus of the group and make that the type rather to try and find what other subordinate groups are included, from which a type might be chosen.

Myers and Hubbs both suggest that these older nomenclatorial categories be superimposed on the current nomenclatorial hierarchy in order that we may then consider and treat ordinal terms (Sub-Order, Order and Super-Order) as co-ordinate.

Myers terminated his statement by stating that it would be much easier when going through the old names to pick out a genus than to pick out the next subordinate category in selecting a type for the group name under consideration.

Hubbs' statement.—Hubbs reiterated the need for superimposing the older names on the current nomenclatorial system. Then having this as a basis one can choose the type of a particular group name from the next lower nomenclatorial category *employed* in that group. He pointed out that if the genus be used as a type, then that genus might serve as the type for all higher group

names (e.g. *Squalus* would serve as the type genus for the family Squalidae, the Order Squaloidea and possibly could be the type through a much higher group which included the sharks, rays and chimeras). The result would be, there would be no way of distinguishing between the composition of these groups.

Hubbs suggested that all proposals of a new group name should state : (1) its characters ; (2) what is included in it ; (3) of what higher category it is a constituent.

Hubbs and Myers then expressed the opinion that the actual nomenclatorial category of a name in the hierarchy is really of little significance and the higher the name in the system the less significant is the group name and the value of its type. They further stated the difficulty if not impossibility of formulating a rule which would govern cases where the contents of a systematic group have been so changed as to warrant the application of a new name (i.e. just how much must be subtracted or added to a category before the name must be changed). Each case must be governed by good judgment, common sense, and practice.

APPENDIX 8 TO DR. FOLLETT'S LETTER

Statement, dated 15th July, 1952, furnished by **ROBERT C. STEBBINS**

As regards names of Orders and higher categories, I am of the opinion that they should be worked out for each major group of animals largely by the zoologists working in the group. Thus, I am in essential agreement with the anonymous author whose comments you present in your letter of 5th July. I believe this article* as well as the Hubbs† and Willlimovsky‡ letters should go to the Commission.

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* See Appendix 1 (pp. 42–46).
† See Appendix 4 (p. 50).
‡ See Appendix 7 (pp. 56–58).

DOCUMENT 4/24

Statement of the views of

ENTOMOLOGISCHE GESELLSCHAFT, BASEL

Extract from a letter, dated 30th July, 1952, from M. HENRY BEURET

Vol. 7, Part 4

Paras. No. **1–20** Rien à objecter (pages 97–108).

DOCUMENT 4/25

By **J. CHESTER BRADLEY** (*Cornell University, Ithaca, N.Y., U.S.A.*)

Statement received on 30th July, 1952

EDITORIAL NOTE: Dr. Chester Bradley's statement is not reproduced here, for it was adopted without amendment by the American Committee on Entomological Nomenclature and, as such, was communicated by Professor Charles D. Michener under cover of a letter dated 24th July, 1952, and has been included in the present series as Document 4/22.

DOCUMENT 4/26

By **W. E. CHINA,** M.A., D.Sc. (*British Museum (Natural History), London*)

Extract from a letter dated 20th August, 1952

REF. Z.N.(S.) 360 (ORDINAL, ETC. NAMES)

In general, I am in agreement with your proposals but would prefer Alternative No. 2 in paragraph 19 (page 107), whereby the rationalisation of the higher taxonomic categories would not be subject to hard and fast rules but would depend on individual judgment by the Commission on the application of specialists, its final decisions to be incorporated in an *Official List of Valid Major Group Names.*

DOCUMENT 4/27

By **K. H. L. KEY**

(*Commonwealth Scientific and Research Organisation, Division of Entomology, Canberra, Australia*)

Extract from a letter dated 4th September, 1952

Note :—The main portion of the above letter was concerned with the problem of the emendation of names, on which a separate paper has been submitted by Dr. Key and which constitutes Document 5/26 of the Copenhagen Series.

I have studied your proposals in connection with the other six questions referred to you by the Thirteenth Congress, and in general I find myself in hearty agreement with them.

DOCUMENT 4/28

Statement furnished by the
AMERICAN SOCIETY OF PARASITOLOGISTS

Extract from a letter dated 8th September, 1952

The American Society of Parasitologists at its meeting in November of 1951 appointed a committee to investigate the controversy that arose following the announcement that " far-reaching decisions in regard to zoological nomenclature (had been) taken by the Thirteenth International Congress ".

In undertaking its assignment the *Bulletin of Zoological Nomenclature* was studied and the requests for advice in Volume 7 were noticed. The committee reached a unanimous decision on only three points*.

(1) The committee believes that it is better to have no rules to govern the use of names above the familial level.

. . . . .

In submitting these comments to you the Society wishes to express its gratitude to you and the entire International Commission for the considerable effort that has been expended in behalf of zoological nomenclature.

Signed for the Society by its Committee

ALLEN McINTOSH

D. H. WENRICH

G. W. WHARTON, *Chairman*

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* *Ed. Note* :—The other points here referred to are given at the appropriate points in the present volume.

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